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ABSTRACT

This teacher guide, an EE Toolbox resource, is a collection of stories about teachers who initiated environmental programs in their classrooms and schools. The guide is divided into three units. The first provides a brief overview of the scope, history, and value of environmental education. The second offers suggestions for instructional materials, funding, workshops, courses, and in-service opportunities in environmental education. The third unit includes information on networking with other environmental educators, securing grants for your environmental education program, dealing with a growing environmental education project, and locating awards, scholarships and stipends that are available for environmental educators and their students. Each unit contains general information about how to bring environmental education into the classroom, a list of sample sources to consult for more information, and a collection of stories to provide imagery of how other teachers incorporated environmental education into their classrooms. The index identifies areas of environmental education content covered in the stories, such as water quality, toxins, and energy consumption. The index also identifies areas of environmental education process, such as developing student awareness and motivating student action-taking. The appendices include a list of select resource materials, suggestions for resources to include in your library, and a feedback form. (MKR)

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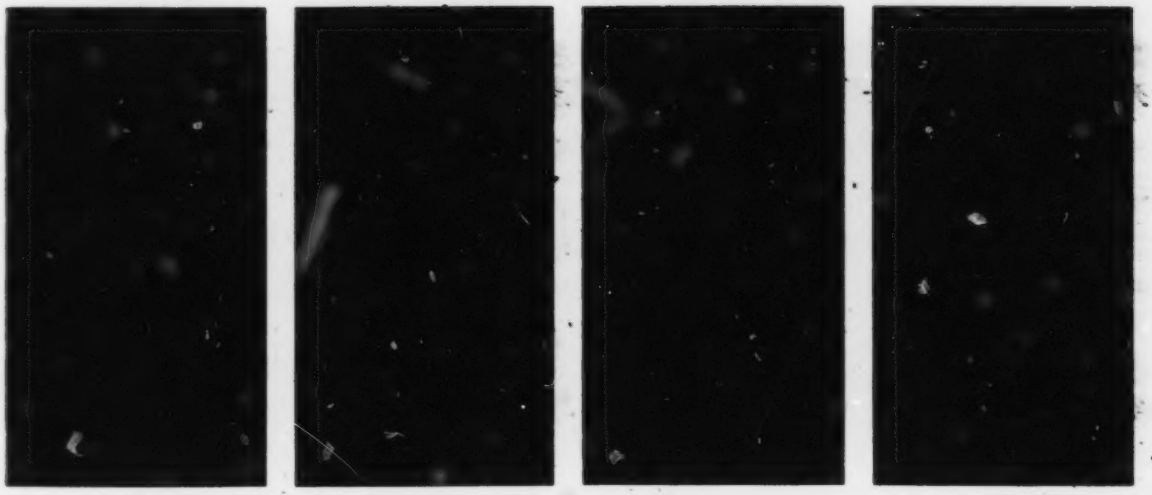
ED 373 981

Getting Started

A Guide to Bringing Environmental Education Into Your Classroom



The Environmental Education Toolbox

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Getting Started: Errata & Updates

In any directory of resources, the information listed can change over time. NCEET has compiled this update to help ensure that Getting Started provides you with the most correct and up-to-date information possible.

p. 50, 113 Project Eco-School is now the Center for Environmental Education (same address and phone).

p. 83, 113 NAAEE Washington Office correct address and phone:
1255 23rd St. NW, Suite 400
Washington, DC 20037
202-884-8912

p. 86 The Pew Charitable Trusts (PEW in upper case letters is incorrect) do not currently provide support to schools or teachers for school-based environmental education programs and activities.

p. 113 The National Toxics Campaign has disbanded.

p. 115 Georgia - Bob Moore, School Support Team Member: correct phone number is 404-656-2686

p. 122 The New Jersey Association for Environmental Education has disbanded.

p. 130 Ocean: Consider the Connections is now out of print.
The Center for Environmental Education (unrelated to the listing shown above for Project Eco-School) is now:
Center for Marine Conservation
1725 DeSales St., NW
Washington, DC 20036
415-429-5609

p. 131 The EarthTime Project has changed to:
E2
881 Alma Real Drive, Suite 118
Pacific Palisades, CA 90272
310-573-9608
E2 is developing a new curriculum. Call them at the number above for information on curriculum availability.

p. 135 The Environment Source Book Sources Annuals is no longer published.

p. 137 P-3, The Earth Based Magazine for Kids is no longer published.

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Getting Started

A Guide to Bringing Environmental Education Into Your Classroom

Edited by
David Bones

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The EE Toolbox supports environmental inservice education. Toolbox resources are designed to help inservice educators broaden their environmental education programs for teachers.

The Toolbox

— Workshop Resource Manual– provides background for trainers and workshop activity outlines. The manual will cover topics including:
  - Defining EE
  - Designing Workshops
  - Integration of EE
  - Reaching New Audiences
  - Approaches to Issues
  - Using Local, Remote and Computer Resources
  - Evaluation
  - Developing Administrative Support

— Classroom activity collection.

— Collection of reference articles on EE and education.

— Slide Resource Kit for use in EE work shops with classroom teachers. A prepared slide show and audio narration provides an introduction/overview of EE. Additional slides on special topics can be used to create a variety of other slide presentations.

— Getting Started – a collection of teacher success stories and a guide to EE for classroom teachers.

— Success Story Primer – an exploration of the use of stories in EE curriculum.

— Computer disk of Toolbox handouts and overhead masters.

NCEET works to support, enhance and extend effective environmental education in grades K-12. In addition to the EE Toolbox, NCEET activities include:

— working with a variety of resource management and education organizations to develop inservice training programs and workshops using the EE Toolbox.

— making the materials and the messages of environmental education more accessible to teachers and students. NCEET has an on-line computer service (EELink) that will provide a single point of access to environmental educational resources on the Internet.

— expanding the audience for environmental education. In 1994, NCEET will publish articles and columns in trade literature and the popular press and host a series of roundtable and working meetings. Collaborations with corporate partners will provide the opportunity to reach mass audiences through television programs and additional computer networks.

— supporting partners in "small experiments," exploratory efforts with important implications for educators.
Examples include:
  — Urban EE with Howard University
  — Remote sensing and EE with Aspen Global Change Institute
  — Environmental Education in Native American communities with the Sonoran Arthropod Studies, Inc.

Toolbox

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Finally, many thanks to the teachers who so willingly shared their time, experience, and stories. We hope that their enthusiasm for environmental education and willingness to share their experience inspires readers to begin their own initiatives.

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Introduction

What is "Getting Started?"

"Getting Started" is primarily a collection of stories about everyday teachers who initiated not-so-everyday environmental programs in their classrooms and schools.

The teachers profiled are special, dedicated individuals, but they are in no way unique or exclusive. They represent hundreds of teachers nationwide who teach in high schools, middle schools and elementary schools; public schools and private schools. They are teachers in urban, suburban and rural areas; science teachers, math teachers and language arts teachers; history teachers, art teachers and teachers of home economics.

Some of the teachers profiled in "Getting Started" have been nationally recognized. But the majority are everyday teachers whose successes are only locally known. Many were surprised when they received our telephone call asking for their story. "Why do you want *my* story?" was a common reply. Surprised or not, the teachers included in "Getting Started" enthusiastically explained the details of their efforts in interviews that, in many cases, lasted over an hour. All were eager to share their story with others who are just "Getting Started."

The process of creating the story usually involved subsequent calls to fill in details. In many cases, contextual details were also added to increase the readability of the story. To insure accuracy of the resulting story, however, a draft was sent to the teacher for comments, and the story was edited accordingly.

Throughout the book are brief sections covering educational materials and resources, funding, environmental education workshops and in-service opportunities, and the locations of other educators interested in environmental education. These lists are not comprehensive; but are designed to help teachers find resources to meet their unique needs.

Why this Guide?

"Getting Started" was originally envisioned by the National Environmental Education and Training Foundation as a directory to various models and methods of environmental education in kindergarten through twelfth-grade classrooms. It became apparent through collaboration with NCEET, however, that many such "directories" already exist. It also became clear that it is not a lack of interest or materials that prevents teachers from initiating environmental education (EE) efforts in their classrooms. Instead, it is the usual constraints: limited financial resources, little time for additional lesson plans, lack of knowledge about how to integrate EE materials into existing lessons, and so on. Therefore, it appeared that what would be most useful to teachers interested in initiating EE efforts in their classrooms would be a glimpse of the many useful resources that exist, and some examples of teachers who have been able to overcome the usual constraints.

It was obvious that the effort should be organized around stories of real teachers. Why stories? Interesting stories can contribute to one's recall, comprehension and ability to apply concepts from one setting to another by providing imagery from other people's experiences. The stories are intended to highlight the creativity of educators who have infused EE

into numerous subject areas to the delight of students, parents, and school administrations. It is hoped that these glimpses into classrooms across the country will inspire other teachers to add environmental concepts to their lessons, to design units that lead their students in the study of local environmental issues, to attend environmental education workshops, and to network with other environmental educators.

An underlying theme throughout this guide is the belief that environmental education promotes not only an environmentally literate public, but is also an effective means of raising the quality of the total educational experience. As the stories illustrate, environmental education increases student participation and achievement in all areas of learning by promoting the study of issues that really interest them.

How to Use "Getting Started"

"Getting Started" is intended as a road map of suggestions and ideas for teachers who are interested in bringing environmental education into their classroom. Like a road map, "Getting Started" does not tell its users how fast they need to go, by which route or even where they should end up. Instead, it is intended to provide teachers with ideas of what to pack, what to expect on their journey, where to go for help, and how to share the sights and surprises of their journey with others along the way.

"Getting Started" is divided into three units. The first provides a brief overview of the scope, history, and value of environmental education. The second offers suggestions for instructional materials, funding, workshops, courses, and in-service opportunities in environmental education. The third unit includes information on networking with other environmental educators, securing grants for your EE program, dealing with a growing EE project, and locating awards, scholarships and stipends that are available for environmental educators and their students.

Each unit contains:

(1) General information about how to bring EE into your classroom. Teachers are used as examples in these sections, with the title of the story that features them in quotation marks following the teacher's name.

(2) A list of sample sources to consult for more information. Longer lists of organizations and resources are included in the resource indices.

(3) A collection of stories to provide imagery of how other teachers incorporated environmental education into their classrooms.

An index of stories provides readers with information about each story. The index identifies areas of EE content covered in the story, such as water quality, toxics, energy consumption, and so on. The index also identifies areas of EE process, such as developing student awareness, motivating student action-taking, and so on.

The appendices include a list of select resource materials, suggestions for resources to include in your library, and a feedback form.

	Teacher Name	Story Title	Page	Grade	EE Content							EE Process						
					Water Quality	Air Quality	Solid Waste/Recycling	Wildlife Habitat/Endangered Species	Toxics	Energy Consumption		Using an Interdisciplinary Curriculum	Creating A Student-Centered Program	Developing Student Awareness	Increasing Student Knowledge	Encouraging Student Attitude Development	Building Student Skills	Motivating Student Action-Taking
Unit 1	Batastini	*Caribbean Dream*	19	High	x	x		x	x			•		•	•	•	•	
	Challa	*Themes for a Lesson Plan*	22	Elem				x				•		•	•		•	
	Chapman	*Stories Connect Past and Future*	24	High	x				x			•		•	•		•	
	Hamn	*The Most Appealing Peanut*	26	Elem			x							•	•	•		•
	Warner	*From Kentucky to Russia... With EE!*	28	High	x				x			•	•	•	•			•
	Tucker	*Am I Teaching Them Enough?*	30	High	x		x		x				•	•	•	•	•	•
	Kelly, Lynn	*Eagle Project Takes Wing*	32	Mid				x				•			•			
	Ferriss	*Too Much Stuff*	34	Mid			x		x			•	•	•	•	•	•	•
	Mitchell	*Nature Trail Into the Mainstream*	36	Mid				x				•	•		•			
	Leigh	*Okra's O.K.*	38	Elem								•		•	•	•	•	
	Zuckerman	*Action for the Forest*	40	High				x				•	•	•	•	•	•	•
Unit 2	Dahlquist	*"Z" is for Zero Waste*	62	Elem			x	x						•	•	•		
	School	*Learning on the Job*	64	Mid	x							•	•	•	•			•
	Fowler	*Adapting Assignments*	66	Mid	x			x				•			•		•	
	Hauser	*Who's Part is This?*	68	Elem			x							•	•			
	Holsten	*Spilled Oil Spreads Science*	70	Mid	x					x		•	•	•	•	•	•	•
	Williams	*A Picture Tells a Thousand Stories*	71	Elem				x				•		•	•			
	Trusler	*The Energy Patrol Strikes*	73	Elem						x		•	•	•	•	•	•	•
	Terminello	*The Greening of Dania*	74	Elem								•		•	•	•	•	•
	Kelly, Jorn	*Mangrove Monitor Madness*	75	Mid				x				•		•	•	•		
	Marsh	*Big Sky Country Expeditions*	76	Mid	x	x	x	x	x	x		•		•	•	•		
	Kenna	*Empowering Emily*	78	Mid								•		•	•	•	•	•
	Rich	*Things That Aren't Supposed to Be There*	80	Elem			x					•		•	•	•		
Unit 3	Pine	*We Never Give Up!*	92	Elem		x				x		•	•	•	•	•	•	•
	Alexander	*The Big Stink*	94	High	x									•	•	•	•	
	Grove	*Handling Hurdles*	95	High	x					x				•	•			
	Cochran/Pillsbury	*A Rainforest Takes Over the School*	97	Mid				x				•		•	•			•
	Novak	*One Fish, Two Fish, Red Fish, School Fish!*	99	High	x				x					•	•		•	
	Mullinix	*The Sky's the Limit*	100	Mid								•		•	•			
	Smith	*Have You Seen My Slender Salamander?*	102	High				x				•	•	•	•	•	•	•
	Turner	*Big Brothers, Big Sisters*	103	High	x									•	•			
	Hines	*Recycling Snowballs*	105	Elem			x					•		•	•	•	•	•
	Jenore	*Where Do Carrots Come From?*	106	Elem								•		•	•	•	•	
	Christy	*An Interested and Energetic Force*	107	Elem	x		x	x				•						
	Peacock	*Partners in Philanthropy*	109	Elem								•	•				•	•

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We Welcome Your Feedback

Above all else, we hope that this guidebook provides educators with useful information, in a manner that is enjoyable to read. We encourage and would greatly appreciate your comments on both the organization and contents of this book. In addition, if you know of a successful profile, or are yourself using environmental education in innovative ways, please contact NCEET. We can most effectively address your feedback if you put your comments and concerns in writing. A postage-paid reply form is included at the end of this guide for your convenience.

Unit 1
The Beginning

The Beginning

Am I an Environmental Educator?

In Leslie Dahlquist's classroom (*"'Z' is For 'Zero Waste'"*) "A" isn't for "Apple," it's for "Aluminum." She uses "Aluminum" to begin the week's discussion of recycling. Each week for the remainder of the school year, Leslie, a kindergarten and first-grade teacher in Topanga, California, uses a letter from the "Environmental A-B-C's," a book that she and her students created three years ago, to guide each week's lesson planning. Tim Fowler, (*"Adapting Assignments"*), a sixth-grade teacher in Baltimore, supplements environmental topics from his science text with assignments that include studying the effects of human impacts such as nutrient loading, shipping channels, and overfishing on the nearby Chesapeake Bay. Aline Novak (*"One Fish, Two Fish, Red Fish, School Fish"*) is a high school biology teacher in western Maryland. Her students study the effects of a herbicide used for local crops on local waterways by conducting experiments with trout they raise in 55-gallon drums in her classroom.

Most likely, neither Leslie, Tim nor Aline think of themselves as "environmental educators." In fact, it is unlikely that many of the teachers featured in this guidebook consider themselves to be "environmental educators." And yet they— like countless other teachers across the country— are incorporating environmental themes into their lessons. In doing so, they are increasing their students' awareness of the environment, leading students to adopt environmentally conscious attitudes and behaviors, and teaching students the knowledge and skills to make environmentally responsible choices. That certainly makes these teachers environmental educators. If you, like the teachers featured in "Getting Started," are bringing environmental issues into your classroom, you too are an environmental educator.

What is "Environmental Education?"

Environmental education is more than teaching about the environment. It is about people. Environmental education stresses the exploration of attitudes and values, and the development of knowledge and skills, so that people can take an active part in decision-making in the world around them.

Environmental education is not a subject-specific content area. Rather, it is an educational process made up of five elements: Awareness, Knowledge, Attitude, Skills and Participation.

Awareness

Environmental education seeks to build awareness– both a sensory awareness of the world around us, as well as an awareness of societal issues and problem-solving strategies. To Lydia Hamn (*"The Most Appealing Peanut"*), a fourth-grade teacher whose students learn about overpackaging through an activity that puts them in charge of creating the "most appealing peanut," environmental education is "helping students become aware that there are choices they can make as consumers, and that there are many implications to the choices they make."

Knowledge

Increased awareness encourages students to improve their knowledge and understanding of natural processes as well as social, political and economic processes. This is important to David Chapman (*"Stories Connect Past and Future"*), a high school teacher who relates stories of environmental problems in Michigan to similar incidents around the globe to illustrate "the interconnectedness of the world."

Attitudes

Students' attitudes may change or mature as they develop a deeper appreciation of and respect for the natural world and for individual people and cultures. Mary Jo Terminello's third-grade students (*"We Never Give Up"*) formed a "baggie brigade" to collect soil from home to grow plants in their classroom. Once they saw their actions made a difference, they felt a greater responsibility to the environment and began to pursue other environmental endeavors. They raised money and gathered enough materials to plant more than 600 plants and 60 trees and shrubs at the school.

Skills

The development of process skills involves teaching students how to think, not what to think. This enables them to become more effective decision-makers. Decision-making skills include: critical thinking and communication skills, analytical and observational skills, negotiation and conflict resolution skills, and the ability to identify and clarify values. To David Tucker (*"Am I Teaching Them Enough?"*), whose students conduct "garbage chemistry," an analysis of soil samples from a local landfill, environmental education is a way to teach students analytic skills, and to have students investigate real issues that personally affect them.

Participation

Ultimately, the goal of environmental education is to encourage students to apply their knowledge, skills and commitment outside the classroom— for students to participate in decisions. Participation can mean changing personal behavior, or involving oneself in decisions affecting the school, neighborhood or community. To Bonnie Trusler, whose fifth-grade students studied their school's energy consumption (*"The Energy Patrol Strikes"*), environmental education is a way of "helping kids know they can make a difference." And her students had a real impact. They actually designed and implemented a program that reduced their school's electricity consumption by about 25 percent, saving their school thousands of dollars.

Is Environmental Education New?

Both the term "environmental education," and the strategies associated with it, emerged in the 1950's and gained momentum with events in the 1960's and 70's. Events such as the publication of Rachel Carson's book *Silent Spring* in 1962, the first view of the whole Earth broadcast from space in 1969, and the first Earth Day in 1970 increased awareness of human impact on the natural environment. Growing concern over fuel shortages, soil erosion, population growth, air and water pollution, and the problems of the urban environment created a demand for a special kind of education— one that examined human behavior, and political and economic decision-making as well as biophysical science.

Several earlier educational movements greatly influenced environmental education. Nature Education encouraged learning by first-hand observation and direct experience, both in the classroom and outdoors. While it began in the late 1800's and remained popular until the 1920's, Nature Education has had a lasting influence on early childhood and elementary science education.

Conservation Education began in the early 1900's. Today, conservation educators and resource specialists educate the public about the importance of wise-use, scientific management and conservation practices to prevent further degradation of natural resources. The Progressive Education movement stressed "learning by doing," and steered curriculum reforms toward a more holistic approach to learning. Outdoor Education evolved more recently. It is primarily an educational approach or method, as opposed to a subject area. It encourages the use of the outdoors as an alternative educational setting to the classroom.

Other movements have also influenced environmental education. The Civil Rights movement made a contribution to environmental education by inspiring individuals with a belief in the power of the individual to shape society. In turn, this movement led to the growth of environmental organizations, the creation of the Environmental Protection Agency and the passage of the Clean Water Act of 1972.

Environmental education is distinct from previous educational strategies. It stresses the combination of values exploration, knowledge and skill development, and a commitment to action. By including both the natural and human-built environment, and by encouraging people to develop both a sense of wonder and a sense of responsibility for their environment, environmental education addresses the heart of environmental problems and solutions—that is, human behavior.

Why Environmental Education?

Why do Leslie Dahlquist, Aline Novak, Tim Fowler, Lydia Hamn, David Tucker, Mary Jo Terminello and countless other educators teach about the environment?

On one level the answer seems obvious. As we learn more and more about the impact of humans on the life-sustaining systems of Earth, it is critical that we re-examine our relationship to our environment through environmental education. Quality environmental education will lead to the acquisition of knowledge, the development of analytical skills, the beginning of environmentally conscious attitudes, and, ultimately, to environmentally responsible behavior.

Today's students are tomorrow's leaders and decision-makers. They need to learn and practice the skills necessary to protect, preserve, and restore the environment. There is a real need to educate people about issues such as air and water quality, the sustainability of our natural resources, loss of species diversity, and waste management so that they can make intelligent, responsible choices in the future. Simply put, environmental education may be a matter of survival.

But why teach environmental education *at school*? Or why, for example, in social studies, math or English class? How is environmental education relevant to urban students? Can environmental education be taught by teachers without a science background? Won't environmental education crowd out a curriculum that is already bursting at the seams?

Environmental education is an excellent means for interdisciplinary study. The skills and knowledge students learn are readily transferable to other disciplines. Lynn Kelly's science students (*"Eagle Project Takes Wing"*), use math skills to analyze data from nearby Glacier National Park eagle populations. "The other math teachers are delighted that I can help reinforce math concepts. The kids usually don't know why a ratio or percentage is helpful, they just memorize the formula. By talking about eagles or buffalo, these math concepts have a context and finally become relevant."

Environmental education is appropriate for any audience. Gary Smith (*"Have You Seen My Slender Salamander?"*), is a biology teacher in a high school where students of color make up a majority of the population. He believes that involving minority students in the environment means "you have to tie the human environment to the natural environment through environmental education activities that involve collaboration, negotiation, agreement and problem-solving." His students learn that homelessness and poverty are just as much environmental issues as the endangered species they study.

You don't have to have a science background to teach environmental education in your classroom. John Scheer (*"Learning on the Job"*), a teacher certified in social studies and language arts, designed and now teaches an environmental issues course. He sometimes "simply learns right along with his students" as he delves into environmental themes to help focus the course on student interests. David Marsh (*"Big Sky Country Expeditions"*), invites representatives from the Fish and Game Commission, the Soil Conservation Service, and the U.S. Forest Service to speak to his class about local environmental issues.

Environmental education can be integrated into existing curricula. To Mary Batastini (*"Caribbean Dream"*), a teacher who developed an integrated curriculum for ninth graders at her school, environmental education has meant increased student enthusiasm for school. "The ninth grade has the best attendance record in the school. We're getting rave reviews from parents, too."

Environmental education is exciting. It is an excellent way to engage student interest and motivate student learning.

Do I Have to Go It Alone?

Although it may be up to you to take the first steps in bringing environmental education into your classroom, you will likely find support from a variety of sectors. Your colleagues, your school administration and your community are all potential allies.

Communicating with other teachers about your ideas will likely generate additional ideas and you may find enthusiastic supporters who wish to help with your efforts. Perhaps you can, as Rosalie Cochran did, enlist other teachers in your EE initiative. Her rainforest unit (*"A Rainforest Takes Over the School"*) has grown over the course of five years to include participation by nearly every teacher in the school.

Sharon Ferriss (*"Too Much Stuff"*), describes her EE efforts as "very much a team effort, including teachers, administrators and students." Discussing your ideas with your principal, superintendent and perhaps even the school board, and encouraging their support, may open more doors. Mary Batastini (*"Caribbean Dream"*) sold her principal on her Earth-WISE curriculum by presenting him with a well-thought out idea. The principal gave her permission to pilot the project. The program involves the entire ninth grade and is getting rave reviews from students and parents alike. Jerry Christy (*"An Interested and Energetic Force"*) reports that environmental education has coalesced the school community into one "interested and energetic force."

Your community can have a tremendous impact on your EE program, and your program can benefit the community. Teachers often find that pooling the energies of these two sectors results in an amazingly dynamic environmental education program. When Mary Jo Terminello (*"The Greening of Dania"*) needed soil to begin her project to "green" her school grounds, she turned to parents for support—and got it. Denise Leigh (*"Okra's O.K."*) and Debra Mullinnix (*"The Sky's the Limit"*) encouraged families from the community to participate in their schools' gardens. One of Bonnie Trusler's students (*"The Energy Patrol Strikes"*) ventured into the community to implement the class's energy reduction program at the local post office.

You might find that your community views environmental education as a "scare tactic," "propaganda," or as a threat to local livelihoods. David Marsh (*"Big Sky Country Expedition"*) faced a similar dilemma. But he was able to teach EE in a non-threatening way in this community, where most jobs are in agriculture, talc mining or logging. "The kids get into lively discussion since their families are involved in one aspect of the environment or another." Although controversy is at times unavoidable, David sees it as an important part of the learning process.

Often, gaining community support simply involves open communication with those who oppose the idea. Even the strongest opposition may be convinced to support your environmental education program when they have a clear understanding of your ideas and motives.

In most cases, your initial show of determination, enthusiasm, and commitment for environmental education is all it will take to get support for your initiative. If there is opposition to your idea, ask for a trial run. Once your program begins, it will be hard for anyone to deny its merit.

Caribbean Dream

Level
- High School

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources

The sun smiled brightly on the tiny, Caribbean Island of Providenciales that April day last year. This was not at all like the horrible weather Mary had left behind in Rhode Island. Scarcely a week before, Mary had done her "last minute travel to someplace warm" thing again with the travel agent. Now here she was, settled down for a long weekend of relaxation in a scuba diver's paradise.

Her daughter was down the beach, entrusted for the day to the care of a suntanned scuba instructor. "Scuba diving?" Mary thought. "Not for me!" Mary was all set to do what she liked best on vacation: stretch out on the beach, surrounded by her books, with plenty of time to think. Mary pondered her job teaching ninth-grade English at a vocational school. Thoughts scuttled across her mind like the clouds that had dominated the April sky back home...

"Nobody seems to like teaching ninth grade."

"How can we make ninth grade more enjoyable for teachers and students? How can we make it more effective for the students?"

"How can we fit the program to the kids, instead of fitting the kids to the program?"

"School is such an artificial environment. How can we expose kids to new developments in the real world?"

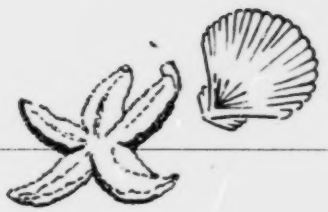
"I've always been opposed to ability grouping. One kid may be a reader, and the next may not be, but they all have experiences to share."

"How can we deal effectively with large classes?"

"After 13 years of teaching at this school, why do I still feel there's more we could be doing?"

Mary Batastini
Wm. M. Davies, Jr. Career and Technical High School
Jenckes Hill Rd.
Lincoln, Rhode Island 02865

These thoughts tumbled through her mind, while the sand sifted between her toes each time she dug them in and lifted her foot back out. As Mary gazed out over the lapping waves, an idea kept surfacing. During the remainder of her vacation, Mary organized her thoughts around the idea: A new way to make ninth grade more enjoyable for both students and teachers, exposing students to cutting-edge developments in the real world. Despite the Rhode Island weather awaiting her, Mary was excited to return to school to discuss this concept with her principal.



Back at school, Mary was both confident and excited in her presentation. "I'd like to offer an integrated curriculum to the entire ninth grade, one that's built around study of the environment. Team teaching. No ability groupings. Mosaic scheduling. Monthly field trips to see how what they're learning applies to the real world. The works!" said Mary. "Earth WISE: Wholly Integrated Studies of the Environment," she continued. The principal was impressed, and Mary got the go-ahead to pick her team of teachers for the core curricular areas: science, social studies, language arts and math.

At Davies Technical School, students spend the first two periods of each day in vocational areas. Ninth-graders, who haven't yet picked a major shop area, rotate through a new one every four weeks. At Mary's suggestion, in addition to the teacher's introduction to the shop area, students are now exposed to environmental information as well. Mary explains: "I met with each of the shop teachers for the ninth grade and asked them if they could include material that ties in the shop area with relevant aspects of conservation and pollution prevention. For example, in auto body shop, the kids learn to recognize the toxic chemicals in the shop, how they are dangerous to people and the environment, and why safe disposal is so important."

Meanwhile, during those first two hours of the day, Mary's team makes their plans. "We started the school year with a blueprint, but no set curriculum. We were really flying by the seats of our pants. We generated a list of skills that a student needs by the end of ninth grade, to make sure that kids get all the basics. We developed a blueprint consisting of quarterly themes: Ecosystems, Land, Water, Air. Each theme is broken into smaller units within the quarter. Generally, we like to start with the big picture, and then focus locally."

The first unit, on the Universe, went something like this: Science classes learned about theories on the origin of the universe, then they focused on some of NASA's recent discoveries about the chemistry of the planets. Social Studies classes picked up the theme, learning to place the 'pieces of the solar system' in their respective positions around the sun, and recognizing their sizes and orbits. The same idea was applied to the 'pieces of the world,' as students were introduced to global geography. Meanwhile, in math classes, students learned about scale, comparing the immense distances of space with more modest ones on earth. And Mary's English students read a number of creation myths, and capped the unit by writing their own myths.

This winter, Mary didn't go back to the Caribbean. Instead, her students transported her to the shore, through the desert, and along scenic river valleys. She explains: "We've developed integrative unit tests. A team of four students is assigned a project in the morning, which is due in the afternoon of the same day. In each class, they work on a different part of the project, putting the pieces together. For this unit, each team had to construct a diorama of an assigned ecosystem. We collected cardboard boxes for them to assemble their projects in, a large stack of old National Geographic magazines they could clip from, and an odd assortment of rocks, soil and twigs from the woods. The scenes had to be realistic and factually correct. All elements in the scene had to be to scale, and the expected variety of life forms had to be represented. Pie graphs on the outside of the box illustrated the relative percentages of each life form in that ecosystem. And attached to the top, like miniature billboards, each student on the team had to write a bit of free verse about their ecosystem diorama."

"We're getting **rave reviews from parents,** too. They say, 'Whatever you're doing, it's working.'"

Mary says "the kids love" the pilot Earth WISE. "The ninth grade has the best attendance record in the school this year, and the kids have noticed that there are fewer fights among them. Even the school nurse says she rarely sees ninth-graders any more. We're getting rave reviews from parents, too. They say, 'Whatever you're doing, it's working. Believe it or not, my kid can't wait to get to school.'"

Mary attributes the program's success to the integrated, team approach. "All the teachers on the team are there because they believe in the idea. Their dedication is clear from the enormous amount of time and effort we've put into making this thing work, and we've been left to develop it ourselves, without administrative involvement. It works for the students because the topics are connected and relate to the real world. Just as important, the ninth-graders all know one another because of the way we've scheduled our classes. And, of course, they have to work together." ■

Themes for a Lesson Plan

Level
- Lower Elementary

Story Focus
- Locating Instructional Resources
- Locating Funding: Fundraising
- Locating Funding: Grantwriting

The cardboard tree looms over half of the first-grade classroom. It's bare when the children arrive in the fall, but by spring it is rich with leaves, animals in its bark and holes, and seeds for future growth. Inside and outside the classroom, the children have incorporated trees into reading, science, fine arts, language arts, math, social science and geography lessons. Teacher Mary Anne Challa uses thematic planning in her lesson plans, with the focus on trees.

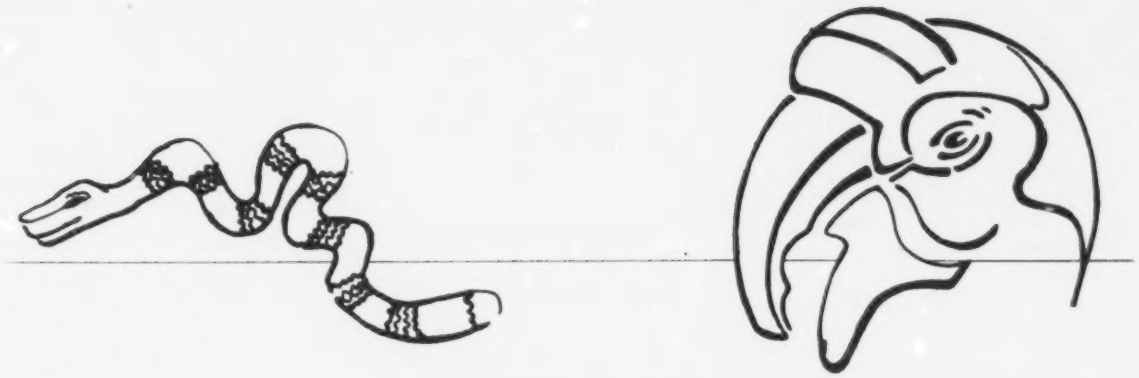
"I think of the Earth as belonging to them," Mary Anne explains. As a parent to her five children, the local Blanford Environmental Education Program encouraged her to get involved. Mary Anne became active and inspired to teach. After having been a mother, a gardener and water-color artist, Mary Anne took up teaching at age 50. From her experience with the Blanford EE Program, she saw how inspirational and integral an environmental education component was to learning and decided to focus her class thematic plan on the environment. In particular she chose trees for the focus, a tremendously popular choice with her first-grade class.

Mary Anne Challa
Stocking Elementary School
863 Seventh Street, N.W.
Grand Rapids, Michigan 49504

The first-graders see a bare tree the first day in class, in the corner of the room, adjacent to a book shelf crammed with books about trees. Over the course of the year, children bring in leaves collected at home or on the way to-and-from school. The children study the leaves under small microscopes. They sort, classify and press all the leaves. They outline the shapes of maple and oak leaves, they feel the sap from the fir trees, they compare chestnuts to acorns to pine cones. Once the leaves are identified, some are attached to the tree while others are used as models to make new leaves out of colored contact paper, plastic and cardboard.

Outside, each child adopts a tree. The child names the tree, identifies the tree, studies the bark, conducts a bark rubbing, notes the leaf shape, the nut, seed or cone, the height and width of the canopy, and takes a string measurement to compare with a second one in the spring to measure growth. The children take responsibility for identifying and noting the changes of the tree during the school year.

As the seasons change, so does the classroom's tree. The children note and mimic the changes in their adopted outdoor trees on the classroom tree. The cardboard squirrels on the tree get fatter as they prepare for winter, as does the stash of acorns in their hole. The insects lay eggs, and then, as winter approaches, they disappear. A cross-section illustrates the fluids that move up and down the tree. As the tree "awakens" in the spring, the children see the water that was stored in the roots for the winter begin to work its way up to the buds, producing blossoms and seeds.



In the spring, a slowly emerging tropical rainforest begins to occupy the other half of the classroom. Layer by layer the children construct the rainforest. As each layer is built, a close study and comparison to Michigan forests and trees is made. There are hundreds of animals, birds, insects and trees to identify and label. New vocabulary words and places to find on the world map excite the children. Most of the children come from single-parent homes, in a lower-income area, and have never left the state.

Brazil, Venezuela, Columbia, and Belize are located and marked on the map. Words such as habitat, xylem and phloem send the children racing to the dictionary. The children compose letters to other first-graders in Costa Rica and await responses. Next year, hopes are to extend this effort by putting together a book on Michigan trees with illustrations and explanations, exchanging it with a book of Costa Rican trees put together by their Costa Rican counterparts.

Stocking Elementary in Grand Rapids tends to be enthusiastic about thematic planning, but funding is tight. Mary Anne takes creative steps when acquiring materials for the classroom. Not only does she apply for small service learning grants through the Kellogg Foundation and the PTA, but she frequently makes trips to local paper mills to scavenge recycled materials, such as paper, cardboard, Styrofoam, plastic and tissue. ■

"The **children take responsibility** for identifying and noting the changes of the tree during the school year."

Stories Connect Past and Future

Level
- High School

Story Focus
- Locating Instructional Resources

David Chapman modestly says that he doesn't "feel like an all-star teacher," but in his own small way he has given students in Haslett, Michigan, an awareness of environmental issues, many of which affect them personally. David teaches ninth-grade physical science, as well as occasional earth science classes. Currently, he is also teaching an elective course entitled "Environmental Issues" to 11th- and 12th-graders.

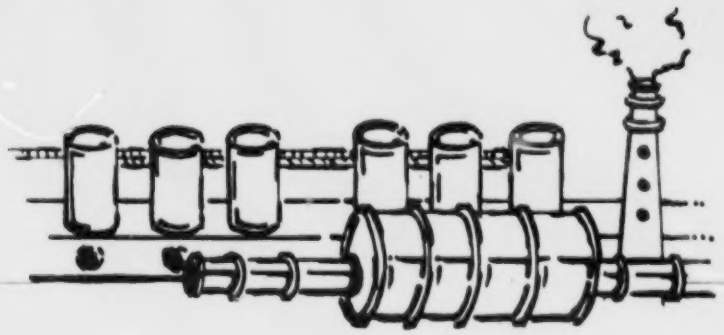
In his classroom after the day's classwork is finished, David appears comfortable. "Even though I've been involved with many school and community environmental projects, and I helped found the school's environmental club, I understand how overwhelming it can be when a teacher is faced with the prospect of teaching about these issues. They are always very complicated and can sometimes bring out a lot of emotions."

He gets out of his chair and ambles over to the large plate glass window at the back of the room. "I know I felt uncomfortable when I started this Environmental Issues class. You just have to take it one step at a time. I was amazed at the positive reactions I got from the students. This is classwork that they can enjoy because they can relate to it."

David Chapman
Okemos High School
4000 Okemos Road
Okemos, Michigan 48864

David is very interested in the way environmental stories affect students. He is currently practicing his story-telling skills as he relates important historical case studies to students. "I couldn't believe that they had never heard of the PBB disaster that occurred throughout Michigan in the early 70's. Fire retardant accidentally mixed into cattle feed caused animals to drop dead all over the state. At the same time, the chemical contaminated the animal's milk, milk that was being sold all over the state. This was something that was directly relevant to the students' lives, and they didn't know about it. When I told the story, they were angry and frustrated. It is important to relay to them the injustices, but also the fact that individuals can succeed with a lot of persistence and understanding of the situation.

"I also try to show them the role of governmental regulation and monitoring, that it is necessary even if it is inadequate. Ideally, these students will take away specific attitudes towards government and environmental issues so they can and will act on problems in the future."

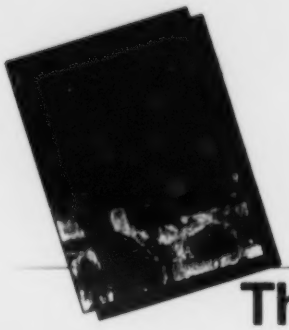


The sources for David's information on these case studies are easily accessible. When preparing a story, he first chooses a subject which is relevant to the students' lives, or one through which he can introduce related information, such as the food chain and toxicology. He then looks up any discussions of the original situation in books and newspaper articles. "With the PBB incident, I began with one book by Rich and Sandra Halber, and went from there. It's refreshing to find out how many other sources one can get from one book."

Other case studies that David has used include Three-Mile Island and the story of Rachel Carson. "Through these stories, I can really show the interconnectedness of the world, tying events in Michigan to similar incidents around the globe, such as the Minimata Disease Disaster in Japan." In 1956, the Minimata Health Department reported that "an unclarified disease of the central nervous system had broken out." Investigators noticed that cats and other animals that ate fish from the bay would stagger around as though drunk, salivating and suffering from convulsions, before dying. These animals helped lead investigators to the cause of the 'disease;' an industrial discharge of heavy metals into the bay.

"I was amazed at the **postive reactions** I got from the students. This is classwork that they can enjoy because **they can relate** to it."

"It is always valuable to show these students that these are not isolated incidents," says David. "When I tell my stories my students become extremely attentive, and can get very emotional. I've had a few who have even cried. That's what I would call 'getting a student's attention!' I often cite the quote 'Those that ignore the past are bound to repeat it' to my students, and I believe that with all my heart. I am just trying to give these kids the knowledge and the tools with which to face a world where environmental disasters are becoming an ever-present reality." ■



The Most Appealing Peanut

Level
- Upper Elementary

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources

Lydia Hamn
Waterloo School
Hudson, Iowa 50643

While her fourth-grade students get organized, Lydia Hamn walks up and down the rows giving everyone one peanut. A low murmur fills the room and Lydia smiles. "Hey, what is this for?" blurts out a student, holding his peanut above his mouth ready to drop it in.

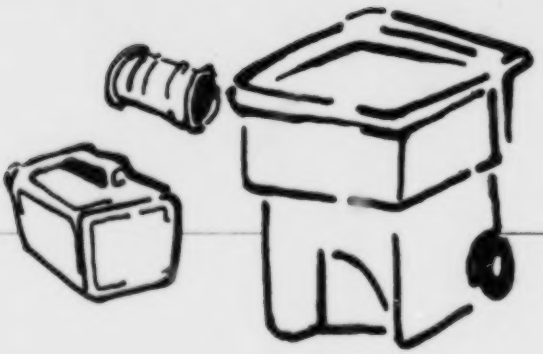
"Each one of you is in the department of advertising for a peanut company, and it's your job to sell this peanut," Lydia announces. "You can use any technique you'd like: You can give your peanut a name, you can write poetry about it, you can even use gimmicks that you've seen on TV. I also happen to have a box over here filled with material with which you can package your peanut." Lydia opens a box filled with gift paper, little boxes, sequins, foil and many other decorations. She gives the students the rest of the hour to package their product. A shuffle of chairs and bodies fills the room as students move about excitedly gathering their supplies.

By the end of the hour, a neat display of packaged peanuts lines the windowsills. Each package has a number and Lydia explains that the next day when the students come back, she'll have them be consumers and go out and order their favorite peanut. When the bell rings to end class, the students leave the room talking excitedly among themselves about their efforts to create the most appealing peanut.

"They can buy anyone's peanut but their own," Lydia says in the empty room. "Inevitably, the majority of the students pick the fancier, more elaborate packaging jobs," she chuckles, pointing to the biggest package, wrapped in brightly colored cellophane with sequins. "The real discussion starts when I ask them what it was that they really wanted. Just the peanut," she emphasizes. "But, you got all this extra stuff and what are you going to do with that, I ask them. From there we roll into a discussion about packaging and what companies do to entice people to buy their products.

"The idea here isn't to point any fingers at particular companies," continues Lydia, "but to help students become aware that there are choices they can make in terms of being a consumer, and there are many implications to the choices they make.

"One little girl told me she made a big sacrifice by giving up her favorite pizza, one that was fully packaged with a colorful cover. She chose another brand with less packaging and now she says she likes it just as much. Another little boy, who was having a birthday party announced to his friends that they shouldn't buy him anything with a great amount of packaging and that they should just bring it in a paper bag. Many of my students also come to school bringing forks and spoons from home, instead of using the plastic ones in the lunch room.



"This is only the beginning of our consumer behavior unit," explains Lydia. "From there, we get into material on landfills and what's biodegradable. We even do a little experiment where we bury typical trash items for three months. After three months, we dig it out and typically find that hardly anything has degraded, not even the newspaper. This leads to a discussion about the process by which materials are broken down.

"We also spend a couple weeks weighing our trash at home to see if it fits with the national average. I have the students notice what goes into their garbage and then think of ways in which their garbage could be minimized. Many of them spend several days designing ways in which they can reuse products.

"The idea here isn't to point any fingers at particular companies, but to help students become aware that **there are choices** they can make in terms of being a consumer **and there are many implications** to the choices they make."

"It's really exciting to see their enthusiasm," Lydia says. "When I first started doing some of these activities, our former principal was not very supportive. He felt it was more important to stick with the curriculum mandates, but I was so excited about the subject area that I went ahead and did some activities anyway. With our new principal, I have a lot more support and I'm hoping I can expand my program and try many more things.

"Although the parents tease me about the little adjustments they've made in their buying habits, I can tell they're supportive," Lydia says. "They share stories about how their grandmother has always reused things. And they realize that it's really saving them money." ■

From Kentucky to Russia...With EE!

Level
- High School

Story Focus
- Locating Instructional Resources

Andrea Warren
Franklin Simpson High School
Bowling Green, Kentucky 42104

Student feedback from Andrea Warren's sophomore biology classes at Franklin Simpson High School has been overwhelmingly positive. Students talk not of "making the easy A's" but instead of "learning lots and loving it." Franklin is a small high school, of about 800 students in rural Kentucky. Andrea's biology course is an extensive hands-on investigation into environmental and bioethical issues, both local and distant. The course is separated into several different projects, all bringing the students into the decision-making process by incorporating their ideas into the development of each project. One project looks at the water quality of nearby Drake Creek. "It's a comparative study," Andrea explains, "taking samples of the water above and below the city and comparing them to studies of previous years. The students report their results to the state of Kentucky and the local town government.

"We also have a sixteen-acre wetland site which the students have used to design an outdoor classroom for use by all schools in the district," continues Andrea. "They study micro-succession and perform comparative studies which help them understand the 'real' world. We're definitely at an advantage as a rural school, compared to those schools in Louisville or Cincinnati. We have a variety of readily accessible areas where the kids can get their hands dirty and get involved."

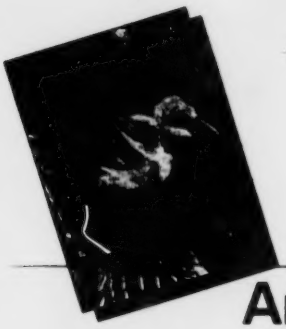
Another project involves case studies on the effects of chemicals on the environment. The students pore over studies on the ozone layer, acid rain, the use of DDT and other pesticides, come up with proposed solutions to the conflicts, then compare their solutions with what has actually been done. They write letters to congressional representatives to voice their opinions on relevant issues.

Andrea has a long history of involvement in environmental education. Most recently, she worked with the Environmental Quality Commission in designing teacher education packets. "I feel a need to be a part of the teacher-teacher relationship as well as the student-teacher relationship," she says. "It's very important, to work with both educators and teenagers in getting raw data from the community and teaching how to ask 'what does this mean,' 'what comes next,' and 'what can we do?'"

Andrea's leadership in environmental education won her the opportunity to travel to Rostov, Russia with other teachers. Now when her students learn about Kentucky's environmental quality issues they compare them with issues in other parts of the world. Cultural differences, political concerns, history, and language awareness supplement the science in cross-cultural environmental issues. The relationship involves the trade of information via letters and telecommunication.

"This is the only way to solve the environmental crisis in which we find ourselves," Andrea says. "We need to be willing to use some of these incredible communication networks to work together to share information, solve conflicts, address issues, and educate our youth." ■

"It's very important, to work with both educators and teenagers in getting raw data from the community and teaching how to ask **'what does this mean', 'what comes next'**, and **'what can we do?'"**



Am I Teaching Them Enough?

Level
- High School

Story Focus
- Enlisting Community Support
- Locating Instructional Resources
- Networking With Other Educators

"Compared with Mr. Tucker's chemistry class at Mt. Baker High School, Deming, Washington, science classes at college have been boring," said Kenneth, who is visiting home during his spring break. "At the university, it's mostly reading books and doing experiments in the lab. In Mr. Tucker's class, we designed and conducted our own research projects, what Mr. Tucker called 'project research.' We identified an environmental problem or concern in the community and went to investigate it. It was 'real' science. Of course, it took a while to set up the investigation so we had a valid experiment, but we never got bored. It was interesting to find out what's really happening right here in our own town.

"My favorite project was one Mr. Tucker called 'garbage chemistry,'" Kenneth continued. "Basically, we went to the Cedarville landfill and got some soil samples. We were finding out if a plume underneath the landfill was leaching zinc ions into nearby bodies of water. It was a nasty place, so we knew we were likely to find something. We took the samples back to school and did a wet lab workup on them, leaching out the heavy metals. From there, we took the samples to the University to be analyzed. Mr. Tucker had a partnership with the university, so we were able to conduct some complicated tests."

Recalling a similar investigation, Kenneth added: "We half expected to find heavy metals in the landfill, but on another project we found zinc and lead along the highway. We were particularly concerned to discover that these materials were migrating into a nearby water system. We wrote articles for the newspaper, went to local conferences, and several of us went to the city council meetings to let people know of our results. That's the best part of doing something real. You don't just turn the page or close the textbook, you follow through to let people know your results."

David Tucker
Mt. Baker High School
P.O. Box 95
Deming, Washington 98244

Having spoken with David earlier, we knew that his students had often found heavy metals and other concerns in soil and water from local areas. We also knew David's students take their investigations seriously. The students in his classes assume the role of scientist and design actual experiments. They develop testing procedures, provide controls, collect data, do analysis, enter data into the computer, and then write and attempt to publish their results. Many then enter a community action phase, attempting to make social, economic or political changes.

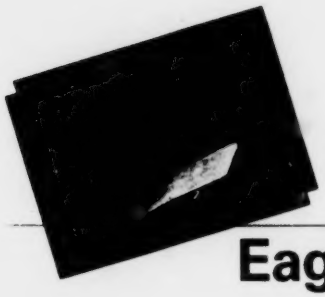
"Not all of our results are conclusive," David told us, "but my main objective is not to get results as much as it is to have students take ownership of their learning. When they get out and investigate real issues, they feel personally involved and become independent learners. When I first changed my style to a problem-solving approach to science instruction, I questioned whether I was teaching them enough science or giving them enough content. But since then, I've learned the answer is definitely yes. I believe project research is a much more effective way to teach than relying solely on a textbook."

"That's the best part of doing something real. You don't just turn the page or **close the textbook,** you follow through to **let people know** your results."

David regards his situation as fortunate, since the State of Washington has few mandates, and in his district there are no curriculum guidelines. In fact, he says that "the whole state is undergoing systematic change, encouraging curricula that are more integrated and ones that incorporate problem-solving." He sees this as a step in the right direction.

An example of change at his school is the recycling and compost program they have developed on school grounds. The school composts everything possible, including food, lawn clippings, and animal wastes from the barn on the school property. They monitor it chemically and biologically, and sell the compost. "Every teacher in the building is involved in the project. It's really had a unifying effect on the staff," says David. "It's great to share in a common project and to exchange ideas and information. Further, the excitement the project generates among the staff sets the tone for the students. The students have come to see the value of learning for its own sake."

"We're definitely headed in the right direction," David says, pausing to reflect on his own words. "I feel strongly that one doesn't need to *teach* students anything; rather, they choose to learn. Our job as educators is to provide them the necessary environment, resources, and guidance. This is the key to instilling a commitment to life-long learning in our students." ■



Eagle Project Takes Wing

"I saw three, Ms. Kelly!" exclaimed Amy, bursting in just before the homeroom bell rang. The 7th-grader had snow in her hair and a grin on her face. "One adult and two sub-adult bald eagles."

Lynn Kelly handed her student labeling pins as she searched the large county map for the right spot. After four weeks of Project Eagle Watch, she was delighted to see this apathetic student come to life.

Level
- Middle School

Story Focus
- Locating Instructional Resources
- Networking With Other Educators

Project Eagle Watch involves Lynn's students in monitoring the bald eagle population in Polson, Montana. The populations regularly vary with the severity of the winter and with the abundance of fish. But there is more to it than that. As introduced species, pesticides, and habitat loss alter the ecosystem, Lynn's students have their own data to help them understand what is going on around them.

"It's a really neat way to teach," explains Lynn, with some excitement of her own creeping into her voice. "I keep the focus on seasonal and local examples so students can see and understand what they are learning. When that happens, they are interested in what is going on, and interested students are much more fun to work with than any others!"

One key ingredient that helped Lynn create the program was joining the professionals out in the field. "They gave me the opportunity to join them in their work. This added to my excitement and made me a more enthusiastic teacher. This enthusiasm is easily passed to the students, especially when their work is contributing to something of interest outside the classroom. Besides, I'm a workaholic, and volunteering with the wildlife biologists was the excuse I needed to do something good for myself."

Lynn Kelly
Polson Middle School
111 4th Ave East
Polson, Montana 59860

Ten years ago, Lynn's volunteerism took her to Glacier National Park every November and December weekend for bald eagle roost counts. She made the wintry drive in the dark to monitor the population at dawn and dusk. It was an exciting project, and very simple. And it was something that could easily interest her seventh-graders.

All 125 of Lynn's students are involved in Project Eagle Watch from the beginning of October to the end of January. When they spy an eagle on their way home from school or out on a weekend adventure, they note the species (both bald and golden frequent the region), township range and section, distance to water, date, temperature, and the bird's activity. Back at school, their observations become colored pins in the county map and records in the database.

"I am convinced that this project helps my students understand the **nature of scientific research,** the value of mathematics, **how to communicate** technical material, and our **responsibility to the environment.**"

As in any project, some students are more interested than others, but by the end of the first month, virtually everyone is paying attention to the growing collection of pins. At that time, students begin to analyze the data. They determine the average number of adult and sub-adult eagles seen per day, and compare this ratio to previous years. These data over four months help students identify the migration peak and its possible relationship to temperature. They use map locations to detect critical winter habitat and determine the percentage of birds in each township and range. Distance to water is converted to mean, mode, and median distances.

While Project Eagle Watch occurs in Lynn's 7th-grade life science class, it is first and foremost an interdisciplinary project that emphasizes math and writing skills, as well as science. "Mathematics is one of the most sterile and least-appreciated subjects in the middle school," comments Lynn, who teaches one section of math. "The other math teachers are delighted that I can help reinforce these concepts. The kids usually don't know why a percentage or ratio is helpful, they just memorized the formula. By talking about eagles or buffalo, these math concepts have a context and finally become relevant."

The project began small and has grown every year. The latest addition is a simulated town meeting to discuss the loss of eagle habitat to subdivisions and malls. Polson, at the south end of Flathead Lake, is experiencing rapid growth in human population, and some of the heaviest development pressure is within one mile of the lake. This is precisely where students have noticed the largest number of wintering bald eagles.

"I do worry about my students' scores on standardized tests," admits Lynn, who rarely uses the text and then only as a reference book. "But, so far, they have all been well within the average range.

"I am convinced that this project helps my students understand the nature of scientific research, the value of mathematics, how to communicate technical material, and our responsibility to the environment. And because we rely on the kids and the eagles to provide our data, it is a little different each year, which makes it exciting for me." ■

Too Much Stuff

"What do we know about ourselves from our garbage?" The young student asks, strolling down the aisle between desks.

"We use too much...stuff," replies a fellow classmate.

"Exactly." The young presenter says, striding to the front of the room. "A group of us from the StATS program took a look at our school: the cafeteria, the classrooms, the offices, and found that paper is the biggest category of waste by weight. We asked ourselves: 'Why is this school throwing away paper when it can be recycled and used for other things?'"

Level
- Middle School

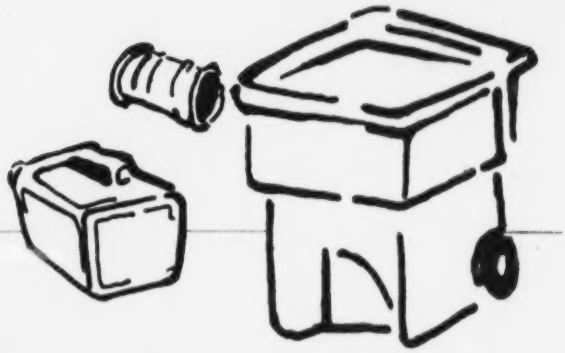
Story Focus
- Enlisting Administrative Support
- Locating Funding: Grantwriting

This scene has been recurring for years in the Quincy Community Schools in rural Michigan because of efforts made by Sharon Ferriss. Since she began teaching 23 years ago, Sharon has given the environment top priority in her classrooms. "I try to use the environment as a classroom topic whenever I can," Sharon says. "It is a way to bring the disciplines together, offer the students a system of ethics, and teach the problem-solving skills necessary to succeed."

Currently, Sharon is teaching gifted youngsters in the "Studies for Academically Talented Students" (StATS) program. In the StATS program, seventh and eighth graders come together once a week from their home high schools in a setting that welcomes their opinions and ideas; in this case, ideas on environmental action.

Sharon Ferriss
Quincy Community Schools
1 Educational Parkway
Quincy, Michigan 49082

A recent StATS project focused on recycling. "The students voiced an interest in recycling at the beginning of the year, and we built the curriculum around it," Sharon says. "Since they are learning about something that interests them they are extremely motivated, often taking their enthusiasm back to their home school in the form of presentations."



The project began with a survey of what was being thrown away in different areas of each student's home school. The students then analyzed the data and gave presentations in science classes at their respective home schools. They formed committees of teachers, administrators and other students in each school to develop a cost-effective plan to save paper. "It was very much a team effort," Sharon notes.

"It is a way to bring the disciplines together, **offer** the students **a system of ethics,** and teach the problem-solving skills necessary to succeed."

The resulting plan called for installing recycling containers and an educational display in each school. Students, with the guidance of teachers, wrote a proposal and received a grant from the local Wal-Mart for $750 to implement their plan.

Sharon Ferriss has organized her teaching career around environmental education. "It's an ideal way to bridge the gap between the academic world and the world that teenagers can touch, feel and that impacts their lives," Sharon says. ■

Nature Trail Into The Mainstream

Level
- Middle School

Story Focus
- Enlisting Community Support

Surrounded by Puget Sound, Vashon Island is a rural and suburban area which boasts one of the best school districts in the area. It also boasts a well-received innovation in environmental education: a nature trail conceived and organized solely by Rod Mitchell's learning disabled class.

With a background in forest ecology, Rod taught at the university level for 12 years. Since deciding that his skills were more useful to younger students, he has taught high school biology for 18 years. He now teaches a class of learning disabled students, which range from "slow learners" to autistic children.

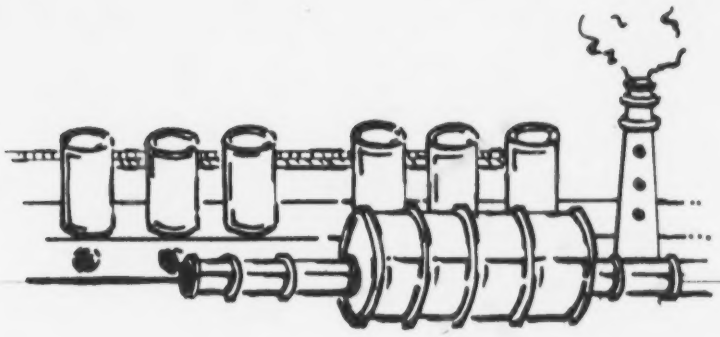
"I have a learning disability myself, and so have a special interest in doing whatever I can with these kids," Rod says, standing on the top deck of the ferry from Tacoma to Vashon Island. He already had a lot of experience with environmental education, having worked on an adopt-a-habitat program and a creek cleanup. "I found myself wanting to do something to fuse my environmental background with an interest in the learning disabled, a group of students often taught in a patronizing manner when it comes to pressing issues in the education field," he explains.

Rod Mitchell
Vashon Island High School
20120 Vashon Highway SW
Vashon Island, Washington 98070

Rod lives in Tacoma. Taking the ferry to work he watches as smoke stacks on the edge of the Sound disappear into the fog. "In this part of the country, environmental destruction is an ever-present monster, often unseen but always there," he says.

The nature trail that Rod's students developed not only connects the high school with the middle school, but extends far beyond both. "I got the idea from a project that seemed to be successful with mainsteam biology students when I was teaching in Denver. I wanted to see if it would work with learning disabled students I teach here on Vashon Island."

He leans into the ferry railing, gesturing in the air as he describes the project. Each student decided on two or three things that they could contribute to the trail, like a descripiton of a decomposing tree or a diagram of field to forest transition. Then they wrote up a description of how these contributions fit into the theme of the trail. One student designed a template in her computer class which could be used to form the descriptions into a booklet. After the booklets were photocopied, the students, on their own initiative, went to the shop teacher and made numbered signs to put up on the trail.



"The students designed a book with a pirate, the school logo, on the front and back covers to emphasize the fact that it was a Vashon project," he says. "Just because they are learning disabled doesn't mean that they are somehow separate from the school spirit."

Rod pauses. He seems to be taking inventory of his ideas. "I began the project with clear objectives in mind. I wanted to build a project which would help these kids feel connected with the school. I also wanted to teach work habits they could use in the future, reinforce a sense of self-esteem, and give them something novel, an experience which wasn't just slowed-down mainstream classwork.

"I was surprised how excited they were by the project," he continued, "and how they took the initiative to make it better. One of them wrote up an article about the trail in the school newspaper. The article spoke about future plans to take elementary students and even people from the community on guided hikes. What a great boost for the school. Something which could teach everyone a great deal about the environment around them and build the self-esteem of a group of children traditionally left out of the 'fun side' of school. I think it's great.

"It's been great involving my students in a project that brings them into the mainstream. It is amazing to me how little it takes to make a difference." ■

"I found myself wanting to do something to fuse my environmental background with an interest in the **learning disabled,** a group of **students** often taught in a patronizing manner when it comes to pressing issues in the education field."

Okra's Okay

Level
- Upper Elementary

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources

The principal of Abingdon Elementary school heaped a second portion of okra onto her plate.

"I remember my grandmother making okra skillet," she reminisced aloud. "I haven't tasted anything this good since I was a little girl!"

"My grandma said she ate okra when she was little, too," offered one student.

"My grandma and grandpa said they grow their own every summer in the backyard," piped up another.

The okra Denise Leigh's first-grade class was enjoying came from Abingdon's "Old World Garden." Denise paused from cooking to explain how the garden came to be. The idea for this garden came from a program called "Seeds of Change" at the Museum of Natural History. Parents and children alike had broken ground the previous spring. For most of the children it was their first gardening experience, and some were hesitant about worms—and getting their hands dirty. But, pretty soon, they wanted to spend the whole day in the garden. "This is my plant, this is our garden, we're doing the work, and we're going to eat what we grow," was the frequent refrain. Their pride was unmistakable.

Denise Leigh
Abingdon Elementary School
3605 South Abingdon St.
Arlington, Virginia 22206

"As a result of a class discussion about what we should plant in our garden, I realized most of the children hadn't even heard of okra," Denise says. "So we decided to grow some in the garden, along with mustard greens and garlic. The soil was pretty poor at first, so we dug in a lot of compost and ended up with raised garden beds. All the work was done by hand—by the children—and we used no chemical fertilizers or pesticides. Each child started with his or her own seedling, and learned how vegetables are grown from seed, to seedling, to adult plant, to harvest."

The garden has been incorporated into every part of the first-grade curriculum. "We made the Old World connection in our Old World Garden by talking about how okra seeds came to this country in the pockets of slaves. The children also graphed the growth of the plants in the garden, and we read some stories about okra together in class. We even did some writing exercises around the recipe for okra skillet.

"The garden helps to connect students in different grades. My first-grade class from last year planted the garden in the spring, but this year's class harvested it in the fall. Come springtime, this year's students will prepare the garden for next year."

At harvest time, the okra was picked by hand. The children cautiously tested the smell, and several noticed the slimy texture on their fingers. Denise knew they'd have to get more familiar with it before they'd actually taste it. "We cut some of the okra in slices and did some okra printing on art paper," she explains. Okra has a distinctive, clover-shaped outline. Some of the okra was left on the plant to provide seed for next year.

The rest went into the okra skillet. While it was cooking, the okra revealed its slippery, slimy nature, and the kids were saying "I'm not going to eat any of that!" Denise simply told them, "If you never tasted this before, you don't know if you'll like it or not."

The result, of course, was inevitable. As Denise describes it: "I had kids asking for thirds. They were really surprised about the taste, after seeing it cook and all. The children appreciated hearing how the principal's grandmother used to make the same meal. They'd heard the same story from their own parents and grandparents, and I think that helped them to take the first bite." ■

Okra Skillet

3/4 pound fresh okra

2 to 3 ears fresh corn

1/4 cup finely cut-up lean salt pork (about 1/4 pound)

1 medium onion, chopped
(about 1/2 cup)

4 medium tomatoes, each cut into eighths

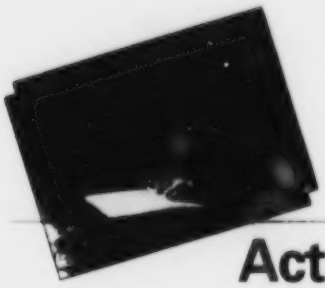
1 cup water

1/2 teaspoon salt

1/4 teaspoon of pepper

Wash okra; remove ends and cut into 1/2 inch slices. Add salt to water and heat to boil. Add okra. Cover and return to boil. Cook about 10 minutes, or until tender; drain. Cut enough kernels from corn to measure 1 cup. Cook and stir pork and onion in 10-inch skillet until pork is golden; stir in okra. Cook over medium-high heat for 3 minutes, stirring constantly. Add tomatoes and corn. Cover and simmer until corn is tender, 10 to 15 minutes. Stir in pepper.

Makes 4 servings.



Action for the Forest

As soon as I walked into my pre-Algebra class, I could tell something was wrong. Usually-lively Nicia rested her head on the desk, doodling on her notebook. Other students murmured, their voices hard with anger. A logging plan had been approved for an old-growth fir and oak forest in Goshawk Grove near the headwaters of our local river, northern California's Mattole.

Level
- High School

Story Focus
- Locating Instructional Resources
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Funding: Fundraising

This remnant forest was a special place to these teenagers. From previous classroom study of the ecosystem (in Environmental Studies), through numerous field trips, and as a by-product of service projects to release salmon, plant seedlings, and map the forest area, they felt connected to this patch of old growth. They understood the science and the politics of the issue, and they came down firmly on the side of protection. The previous 40 years have seen more than 90% of the ancient forest cut. The 76-acre grove facing the chainsaw was in an area that most observers saw as crucial to the health of the remaining salmon runs.

In addition to studying and understanding critical, relevant issues, our fifteen-student independent high school works to involve students in real challenges. Recognizing that our goal of active student involvement in issues might necessitate last minute changes and supersede the standard course schedule, earlier this year the staff budgeted four floating days for "political action." This occasion clearly met the criteria, and after an emergency meeting the staff and students agreed to cancel the next day's classes so we could join an anti-logging demonstration already planned at the site.

We camped upriver that night and were awakened at 4:00 the next morning by sisters from the nearby Benedictine monastery. Fortified with the tea and hot cereal they brought, we—joined by several dozen folks from the local community—hiked to the end of the road to greet the logging crew when they arrived for work. Boy, were they surprised!

Our presence prevented logging that day, since they couldn't cut trees with spectators underfoot and the sheriffs were unprepared to arrest us. We hung out with the loggers, discussing their need for a livelihood from the forest and the salmon's need for clear water—desires that all sides understood. Meanwhile, lawyers scrambled to obtain a court order that would halt the cutting while a lawsuit against the logging plan was debated.

Seth Zuckerman
Petrolia School
PO Box 197
Petrolia, California 95558

The next morning, the sheriff's deputies were ready, and in a couple of hours managed to clear the demonstrators out of the forest. As they were being led away, two students persuaded the grizzled logger they befriended the previous day to shoulder his saw and walk off the job. Within an hour, a judge issued an injunction and the cutting ceased.

The events at Goshawk Grove taught my students they could have an effect on the world—a lesson in empowerment that many of us try to teach at our schools. In this case, they were not only successful in their efforts, but they learned exactly why the demonstration was useful as a delaying tactic and how the court system could be pressed to serve a minority view.

"The events at Goshawk Grove taught my students they could **have an effect on the world.**"

Our students have had other occasions to learn the lesson of empowerment. Last year, some students joined an industrial tree-planting crew for three days to raise money for the school. Another year, when the funding for our local salmon enhancement program was cut off, students organized a campaign to get the money back. They held a press conference at the fishing harbor, wrote letters, phoned legislators, and ultimately the funding was restored. With luck, so too will the salmon. ■

Unit 2
Taking the First Step

Taking the First Step

Getting Your Feet Wet. . .

Teachers thinking about using environmental topics and activities in their classrooms for the first time may have many unanswered questions: Where do I start? Where can I find materials that will meet my classroom's unique needs? How can I identify funding sources to get my program off the ground? How can I learn more about EE? Where can I find EE in-service training opportunities?

This unit aims to answer these questions, and in the process encourage teachers to implement programs in their own classrooms. Perhaps you have tried a few environmental activities in your classroom but are stuck on where to find a curriculum that will work with your class. Or perhaps you've already had some success doing environmental education and are now looking to increase your knowledge of EE by attending an EE workshop.

The stories at the end of this unit are about teachers who recently brought EE into their classrooms. When Vicki Rich *("Things That Aren't Supposed to Be There")* wanted to incorporate environmental themes into her third-grade class, she began searching in the library for information on environmental curricula, and for names of organizations that might provide ideas. "So much material became available from so many different sources," Vicki says, "that I had no trouble creating a one-week, multi-disciplinary environmental unit." David Chapman (*"Stories Connect Past and Future"*) uses nothing but newspaper articles to bring EE into his classroom, while Sandra Jenore *("Where Do Carrots Come From?")* started her class gardening project on a lot donated by the city, with seeds and soil from the Cornell Extension Service and the Parks Department. Karen Kenna *("Empowering Emily")* attended a workshop "on a whim." She was so impressed, she started using the program in her class the next fall. "It's had a major impact on the way I teach," says Karen. "It's totally changed my perspective on teaching."

This unit contains three sections. The first section, "Instructional Materials—Where to Look," contains an overview of sources for EE materials and information. Sources range from local to regional to national and include directories of EE resources and curricula, as well as on-line information systems. The second section, "Financial Support: Easy Money?!," discusses ways to find financial resources to launch or continue your EE program. The third section, "Workshops, Courses, and In-service Opportunities," offers suggestions for teacher workshops, courses and additional training in EE.

...Without Getting Soaked!

Given the enormous scope of the topic 'the environment,' and given the wide variety of environmental education curricula, it is easy to be overwhelmed during your search for information. The problem is not that there is a lack of information, but that there is TOO MUCH.

For this reason, it is generally best to start small. If you've never done EE in your classroom before, you might begin by adding an EE activity into a lesson, then building an entire lesson around a particular theme, and then connecting a series of lessons by a common environmental thread to form a unit. Although it IS important to have enough accurate information to get started, it isn't necessary to have it ALL!

Instructional Materials–Where to Look

To design a classroom EE activity, unit or course, you do not need to start from scratch. A myriad of quality instructional resources already exist at the local, state, regional, and national levels, and many of them are easily adapted to a variety of environments and student levels. This section contains suggestions for locating resources. It contains examples of resource materials directories, instructional materials clearinghouses, and on-line information systems.

Making Use of Local Resources

One aspect of teaching about the environment that seems daunting to teachers is the complexity of many environmental issues. Many teachers simply don't feel they have the background to teach students about environmental issues. You don't have to look far to find resources that can be useful to your EE efforts.

One way to increase your familiarity with an issue is to turn to local experts. When David Marsh *("Big Sky Country Expeditions")*, needed information on the history of game management, he looked to his state's Fish and Game Commission for help. Searching for environmental professionals may also uncover resources for field trips, guest speakers, curriculum ideas and in-service training!

You may already be familiar with some of the sources listed below. You may have contacted your local historical society for information about what the early settlers ate for your history or social studies class. Or, you may have contacted your local Department of Public Works to find out more about where your garbage goes for a unit on local-resource use. You may have invited a volunteer from a local nature center to answer your students' questions. There are a number of people in your community who can help bring environmental topics to life in your classroom.

Below are some examples of local resources to contact.

"Educating Young People About Water: A Guide to Goals and Resources"
Elaine Andrews
University of Wisconsin–Madison
Environmental Resources Center
216 Agricultural Hall
1450 Linden Dr.
Madison, WI 53706
(608) 262-0020

— **County Cooperative Extension Services** often contain a wealth of information and statewide resources. They may have information such as the recent USDA Cooperative Extension Service National Review Team's guide to water-quality curricula entitled "Educating Young People About Water: A Guide to Goals and Resources."

Marine Science Center
18743 Front Street, N.E.
P.O. Box 2079
Poulsbo, WA 98370
(206) 779-5549

— **Nature centers, county parks, local museums, scout headquarters, camps, nature reserves, and local watershed councils** often have the expertise to help answer questions and concerns regarding the local environment. The Marine Science Center in Poulsbo, Washington, for example, produces the Puget Soundbook, an attractive guide to maintaining the health of the Puget Sound region.

— **Local Library.** Libraries are not only a great source for contact telephone numbers and addresses of government agencies, but also for books and other references to use when creating your lesson, unit or curriculum. *This Planet is Mine*, a guide for concerned parents and teachers teaching environmental awareness to children, by Mary Metzger and Cynthia P. Whittaker; and *Consider The Earth*, which describes environmental activities for grades 4 through 8, by Julie M. Gates; and *The Kids Guide to Social Action*, an easy-to-use guide to teaching social action-taking skills by Barbara Lewis, are three such resources that you are likely to find at your local library.

— **Local Government.** Local planning authorities such as your County Drain Commission, City Department of Public Works, Solid Waste Department, Soil Conservation Districts, or the people with similar responsibilities, often have information on resource consumption, community development and land-use planning. Such information may, for example, be useful in developing a case study of a local environmental problem.

NOAA, Sea Grant, R/OR1
1315 East-West Highway
11th Floor
Silver Spring, MD 20910-3226
(301) 713-2431

— **Institutions of Higher Learning.** A nearby college or university can be a source of expertise or environmental education curricular materials. For example, the University of Wisconsin Sea Grant Program offers a comprehensive guide to the Great Lakes. The Ohio State University Sea Grant Program also has a series of innovative units on the lakes.

The American Architectural Foundation at the Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006

— **Local Chapters of Professional Organizations.** Many professional organizations with an environmental focus have educational materials that are available from local chapters. The American Institute of Architects, AIA, for example, has developed *Learning by Design*, a comprehensive approach to education for a quality environment. *Learning by Design* is a system of resources designed to enable educators to develop an enhanced perception of their surroundings and translate this into practical activities for their students. Contact your local AIA chapter for more information.

— **"The Source"** Sometimes the most obvious source is the most overlooked. Local utility companies, the local landfill operator, and other obvious sources often have valuable information regarding your local environment.

Resources Available at the State Level

Resources are widely available from state governments and agencies. Below is a sample of such resources. States other than those listed have similar programs.

Florida Department of Education
Office of Environmental Education
325 West Gaines Street, Room 224-C
Tallahassee, FL 32399-0400
(904) 487-7900

Office of Environmental Education
Department of Environment, Health, and Natural Resources
P.O. Box 27687
Raleigh, NC 27611-7687
(919) 733-0711

State of Indiana's Energy Education Curriculum Project
Office of School Assistance
Indiana Department of Education
229 State House
Indianapolis, IN 46204
(317) 232-9141

Tennessee Energy Education Network
Anne Allen
Energy Education Specialist
Roane State Community College
8373 Kingston Pike
Knoxville, TN 37919
(615) 531-8051

— **The State of Florida Office of Environmental Education** publishes, *Natural Selections*, an annual directory of success stories in environmental education. The directory profiles teachers in that state who have designed and implemented meritorious EE programs.

— **The State of North Carolina Department of Environment, Health and Natural Resources Office of Environmental Education** distributes the *Environmental Education Resource Directory*, a listing of resources and educational materials. The directory is available in various formats, including hard copy, computer diskette, and via an on-line computer bulletin board.

— **The State of Indiana's Energy Education Curriculum Project** offers instructional materials designed to help students become more aware of the implications of their energy choices. The curriculum consists of units on recycling, energy, water resources and air resources and includes case studies, multidisciplinary activities and a resource section.

— **The Tennessee Energy Education Network** publishes a list of companies nationwide that offer science-related materials that are free or under $10.

Resources Available from Federal Agencies

There are many EE materials available from the federal government and its agencies. The following are but a few examples of such sources.

— **The Public Information Center at the US Environmental Protection Agency** offers teacher and student kits (one for K-6 and one for 7-12) of materials on subjects such as water and recycling. Many of these materials are also available from your regional EPA office.

U.S. Environmental Protection Agency Public Information Center
401 M Street SW, PM-211B
Washington, DC 20460
(202) 260-7751

— **Regional EPA Offices.** There are ten regional EPA offices. EPA Region 4, in Atlanta, Georgia, in conjunction with other Federal, State, and local agencies, for example, has developed a comprehensive manual for teachers on the critical resource issues of their area: water quality, air quality and waste. Other EPA regions develop programs fitting the needs of the states in their region. See the resource indices at the back of this guide for your regional EPA office's address.

Tenneessee Valley Authority
Water Management Services
1101 Market Street
Haney Building 2C
Chattanooga, TN 37402-2801
(615) 751-3164

Global Network
of Environmental Education Centers
7010 Little River Turnpike
Suite 290
Annandale, VA 22003
(703) 750-6401

— **The Tennessee Valley Authority** has an Environmental Education center with branches at 16 colleges and universities. The branches focus on teacher enhancement, developing programs on natural resources and environmental issues, public outreach and research. The TVA works with a variety of groups to provide top quality EE teaching materials on water quality and monitoring, stewardship of public lands and other topics. TVA is currently working with the Air and Waste Management Association to produce curriculum materials for air quality and non-point pollution issues, the first of a series of teaching materials aimed at the K-12 audience. TVA also works with the non-profit Global Network of Environmental Education Centers to encourage multi-tiered partnerships and to advance environmental education and training at all levels. See the resource indices section in this guide for the TVA-sponsored EE center nearest you.

Department of Energy
Office of Environment, Safety and Health
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-6151

— **The Department of Energy's** *Partnership for Environmental Technology Education (PETE)* program provides materials development, instructor training, and student support by training environmental technicians and encouraging the pursuit of four-year degrees in environmental science, engineering, and management. The *Global Climate Change Curriculum* provides materials development and teacher enhancement in which interdisciplinary materials are developed by teachers in conjunction with laboratory scientists. Workshops are taught by teachers for other teachers who wish to use global climate change materials in their classrooms.

Department of Education
400 Maryland Avenue, SW
Washington, DC 20202
(202) 401-3679

— **The Department of Education** offers financial support for in-classroom environmental education programs nationwide through the *Eisenhower Mathematics and Science Education* program, which focuses on raising the competency of high school graduates in science and math.

Department of Health and Human Services
Center for Environmental Health and Injury Control
1600 Clifton Road, NE
Washington, DC 30333
(202) 619-0257

— **The Department of Health and Human Services'** Public Health Service education programs help the public learn about environmentally-related health issues. Through the National Institute on Environmental Health Science's *Summers of Discovery* program, the DHHS also offers summer internships for high school students and teachers to participate in environmental health research at NIEHS laboratories.

National Aeronautics and Space Administration
Education Division
300 E Street, SW
Washington, DC 20546
(202) 358-1110

— **The National Aeronautics and Space Administration** provides environmental education through community outreach programs associated with the Kennedy Space Center and Wildlife Refuge in Florida. The *Student Ground Truth Studies Project*, for example, is aimed at teaching K-12 students about their local environment and how it relates to global change.

Department of the Interior
Office of Environmental Affairs
1849 C Street, NW
Washington, DC 20240
(202) 208-3891

— **The Department of Interior** offers hands-on learning and research in outdoor laboratories provided by the nation's public lands through its many service branches. For example, the *Water Education for Teachers* program and *Water Resources Education Initiative* evaluate, develop, and disseminate materials on water resource protection and conservation issues through teacher seminars, workshops, and National Science Teachers Association publications. The *National Parks as Classroom* program provides guided walks, exhibits, and audiovisual presentations at national parks to students and the public on various natural history and environmental protection issues.

Department of Agriculture
Natural Resources and Environment
Environmental Coordination
Auditors Building
Fifth Floor SO
201 14th Street, SW
Washington, DC 20090-6090
(202) 720-7173

— **The Department of Agriculture** conducts elementary, secondary, and undergraduate education as well as public programs that include materials development, teacher and faculty enhancement, student support and recruitment, and public science literacy activities. In the area of Environmental Education, these include the *Don't Bag It, Better Lawns and Gutters, Environmental Landscape Management, C-Scape,* and *Baywatch* programs which improve public science literacy by teaching homeowners about managing their yard waste with sensitivity to local concerns such as waste reduction, water protection and conservation, and habitat values. The *Urban Treehouse* and *Summer of Service* programs teach inner-city youths about resource conservation. The *Project Minority Outreach Recruitment Education/Employment* program encourages minority youth to enroll in college programs and to pursue careers in fields that include natural resource management, mathematics, and science.

National Oceanic and Atmospheric Administration
Office of Educational Affairs
1825 Connecticut Avenue NW
Suite 329
Washington, DC 20235
(202) 606-4380

National Science Foundation
Stafford Place
4201 Wilson Blvd.
Arlington, VA 22230
(703) 306-1234

— **The National Oceanic and Atmospheric Administration** *Summer Institute for Science and Math* provides teacher enhancement in the earth and environmental sciences for middle and high school teachers on topics such as climate change, ozone depletion and acid rain. Through its state-based *Sea Grant Programs*, NOAA supports numerous EE programs. In addition, the Sea Grant Program has supported more than 10,000 students in the study of marine sciences and affairs since 1966.

— **The National Science Foundation** assists middle schools and high schools in developing environmental education curricula. For example, *An Investigative Laboratory to Enhance Environmental Science Education and Teacher Preparation* program at Middlebury College in Vermont gives pre-college science teachers opportunities to teach science from an inquiry-based perspective.

Non-Profit Organizations

Non-profit groups often make curriculum materials available to educators. Three groups are listed below. For a more complete listing of non-profit organizations, see the resource indices section at the end of this guide.

The Sierra Club
National Legislative Office
408 C Street, NW
Washington, DC 20002
(202) 547-1141

For the *Green Guide* write to the following:
The Sierra Club
Dept. SA
P.O. Box 7959
San Francisco, CA 94109
(415) 923-5660

National Wildlife Federation
1400 Sixteenth Street, NW
Washington, DC 20036-2266
(202) 797-6800

Friends of the Earth
218 D Street, SE
Washington, DC 20003
(202) 544-2600

Project Eco-School
881 Alma Real Drive
Suite 300
Pacific Palisades, CA 90272
(310) 454-4585

— **The Sierra Club** produces the *Green Guide*, a listing of free and inexpensive materials such as factpacks, posters, activity suggestion and guidelines for exhibits. In addition, with branch offices nationwide, the Sierra Club provides valuable information and support for EE program development.

— **The National Wildlife Federation's** *Earth Tomorrow: An Urban Challenge* is a program for high school sophomores focusing on positive aspects of the urban environment and involving students in environmental projects in their schools and communities.

— **The Friends of the Earth** publishes an *Environmental Education Resource Guide* to informational resources, curriculum materials and children's books covering environmental themes.

— **Project Eco-School** is an international, non-profit Environmental Education Resource Center that serves as a network for environmental educators and organizations. In addition, they publish *Blueprint for a Green School*, an Environmental Education resource guidebook.

Program Development Resources

Several detailed resources exist to assist educators develop an environmental education program. Among these are:

NAAEE

Publications and Membership:
P.O. Box 400
Troy, OH 45373
(513) 676-2514

— ***Essential Learnings in Environmental Education,*** published by the North American Association for Environmental Education (NAAEE), is a collection of concepts viewed as "essential for environmental literacy." It is designed to act as a database for building environmental education activities and programs and as such will assist teachers in choosing objectives for their programs.

Environmental Education Teacher Resource Handbook

Kraus International Publications
358 Saw Mill River Road
Millwood, NY 10546-1035
(800) 223-8323

— ***The Environmental Education Teacher Resource Handbook: A Practical Guide for Teaching K-12 Environmental Education,*** Richard Wilke, editor, is a reference designed to provide basic information on the background of environment curriculum, as well as current information on publications, standards, and special materials for K through 12 educators.

Environmental Education in the Schools: Creating a Program That Works!

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

— ***Environmental Education in the Schools: Creating a Program That Works!,*** by Judy Braus and David Wood, was written for Peace Corps Volunteers who teach in classrooms around the world and who are building environmental education into their school system. It describes in detail how to create an EE program and provides many well-tested activities available from several sources.

A Guide to Curriculum Planning in Environmental Education

Wisconsin Department of Public Instruction (Publications)
125 South Webster Street
P.O. Box 7841
Madison, WI 53707-7841
Toll free: (800) 243-8782
In Wisconsin: (608) 266-2188

— ***A Guide to Curriculum Planning in Environmental Education,*** by David C. Engleson, is a manual for teachers and school districts that introduces and explains environmental education, value development, relevant teaching methods, and a process for infusing environmental topics into the existing curriculum.

The Journal of Environmental Education

Heldref Publications
1319 18th Street, NW
Washington, DC 20036-1802
(800) 365-9753

— ***The Journal of Environmental Education*** is a quarterly publication published in association with the North American Association for Environmental Education that features articles on current trends in the field of environmental education.

Directories of EE Resources

You may want to begin your search for materials with a directory of EE resources. Several groups publish directories of EE materials, most of which include a brief description of the curricula or materials, suitable grade levels and contact addresses. There are several such entities around the country, and more being developed. Some of these are listed below.

National Wildlife Federation
144 Sixteenth Street, N.W.
Washington, DC 20036-2266
(202) 797-6800
To order the ***Conservation Directory***:
(800) 432- 6564
(Ask for item #79560)

— **The National Wildlife Federation's** *Conservation Directory* lists environmental departments, agencies, and offices of approximately 2,000 U.S. Government agencies, international, national and regional organizations and commissions, colleges and universities with conservation programs, state environmental agencies and citizens' groups, and Canadian government agencies and citizens' groups.

Northeast Field Guide
Antioch New England Graduate School
Roxbury Street
Keene, NH 03431
(603) 357-3122

— ***The Northeast Field Guide,*** covering the 9 Northeastern states (CT, MA, ME, NH, NJ, NY, PA, RI and VT), describes more than 400 organizations, including nature centers, EE centers, planetariums, aquariums, zoos, environmental and science museums, state agencies and state park offices, national parks and wildlife refuges, other environmental directories, EE conferences, environmental job publications and resources, and state, regional and national EE organizations. There are also indices by name and by state with program levels cross referenced.

Harbinger Communications
250 Homestead Trail
Santa Cruz, CA 95060
(408) 429-8727

— ***The Harbinger File-California Environmental Directory*** is a descriptive directory of 1,040 organizations concerned with environmental issues in California.

Rocky Mountain Directory
8850 O'Brien Creek Road
Missoula, MT 59801
(406) 543-3359

— ***The Rocky Mountain Environmental Directory*** lists and describes nonprofit organizations, government agencies, and other organizations in the Rocky Moutain region concerned with environmental education and action.

To order the ***1993-94 People of Color Environmental Groups Directory***:
Charles Stuart Mott Foundation
503 South Saginaw Street
Flint, MI 48502
(313) 238-5651

— ***The People of Color Environmental Groups Directory 1992*** is a listing of 205 people of color groups nationwide that are working on environmental issues. The 1992 edition is also available on EcoNet (see On-Line Information Systems). The 1993-94 edition, to be distributed by the Charles Stuart Mott Foundation, is due out in Spring of 1994.

California Compendium Project
Bill Andrews
Education Programs Consultant
Science and Environmental Education Unit
California Department of Education
721 Capitol Mall
P.O. Box 944272
Sacremento, CA 95814
(916) 657-5374
Publication Sales Office:
(916) 445-1260

— **The California Department of Education's** *California Compendium Project,* is a series of compendia which provide information on quality environmental education materials. The materials in each compendium were evaluated for presentation, pedagogy, general and topic-specific content, and teacher usability to help educators locate curricula that are up-to-date and accurate. The series, produced in conjunction with a variety of California state agencies, includes a *Compendium for Energy Resources*, a *Compendium for Water Resources* and a *Compendium for Integrated Waste Management.* By 1994 the Project will add compendia on the following topics: air quality, human communities, and natural communities.

Clearinghouses and Resource Centers

At times, of course, it is easier to contact a library, a clearinghouse, a resource center or other huge collection of information. There are several such entities around the country, and more being developed. Some are listed below.

U.S. Environmental Protection Agency
Environmental Education Division (1707)
401 M Street SW
Washington, DC 20460
(202) 260-4962 or (202) 260-4965

NCEET
School of Natural Resources
and Environment
University of Michigan
Ann Arbor, MI 48109
(313) 998-6726

Creative Educational Networks
John Inskeep Environmental
Learning Center
19600 S. Molalla Avenue
Oregon City, OR 97045
(503) 656-0155

ERIC/CSMEE
Information Reference Center
1929 Kenny Road
Columbus, OH 43210-1080
(614) 292-6717

Renew America
1400 16th Street, NW
Suite 710
Washington, DC 20036
(202) 232-2252

TERC
2067 Massachusettes Avenue
Cambridge, MA 02140
(617) 547-0430

— **The U.S. EPA** and the **National Consortium for Environmental Education and Training** are developing a computerized Resource Library of instructional materials, lesson plans and video clips.

— Several states including **Florida, Colorado, Arizona and Minnesota** maintain or are developing clearinghouses of environmental education resources. Teachers in these states can look forward to a wealth of information available to them through a phone call or computer request. Contact your state EE coordinator or Department of Education for more information concerning opportunities in your area. See the resource indices for the name and address of your state's EE coordinator.

— **Creative Educational Networks** produces *Clearing* a magazine for educators in the Pacific Northwest that describes current issues, resources, activities and ideas in environmental education. Teachers outside the region may also find it a useful resource.

— **The Clearinghouse for Science, Mathematics, and Environmental Education** is one of 16 US. Department of Education sponsored Educational Resource Information Center clearinghouses. A list of EE publications produced by ERIC/CSMEE can be requested by phone.

— **The Renew America** *Environmental Success Index* is an annual listing of 70 or so exemplary environmental programs from across the nation, a clearinghouse for innovative ideas and established projects. Renew America seeks out programs around the nation, whether large or small, that effectively protect, restore or enhance the environment. Renew America is a non-profit, tax-exempt clearinghouse for environmental solutions.

— **Technology Education Research Center.** TERC is an independent, non-profit organization founded in 1965. It develops software and curriculum materials, including telecommunications-based educational programs, and works with schools to implement innovative programs in math and science.

The Pembina Institute
P.O. Box 7558
Drayton Valley
Alberta, Canada T0E 0M0
(403) 542-6272

— **The Pembina Institute,** a citizen-based, non-profit environmental organization produces *The Canadian Environmental Education Catalogue*, a guide to selected EE resources. The catalogue features more than 1600 resources, each with bibliography, price, and ordering information. The catalogue (also on disk) lists resources from both Canada and the United States.

The Environmental Exchange
1718 Connecticut Avenue
Suite 600
Washington, DC 20009
(202) 387-2182

— **The Environmental Exchange** supports local environmental action by promoting solutions. They act as a clearinghouse of information on a range of successful environmental initiatives including air pollution, transportation alternatives and toxics. Environmental Exchange publishes a series of *What Works* reports, which highlight model programs – including a section that highlights programs at schools, colleges, and universities – and provide contact information for these projects.

On-Line Information Systems

EcoNet
Institute for Global Communications
18 DeBoom St.
San Francisco, CA 94107
(415) 442-0220

— **EcoNet** is an on-line communications system operated by the San Francisco-based Institute for Global Communications. It was designed solely to facilitate the exchange of ideas and information concerning environmental issues and environmental education.

GAIN
575 Soquel Avenue
Santa Cruz, CA 95062
(408) 457-0130
EcoNet: <gain>
Internet: gain@igc.apc.org

— **Global Action & Information Network** is a network of concerned organizations and people—activists, educators, public officials, business owners, students and others—linked by their commitment to create a sustainable world through broad-based citizen action. GAIN is a communication network, a referral service, an information bank, a forum for new ideas, a support system, a source of inspiration and much more.

EELink
National Consortium for Environmental Education and Training
School of Natural Resources and Environment
University of Michigan
Ann Arbor, MI 48109
(313) 998-6726
Internet:
eelink@nceet.snre.umich.edu

— **The National Consortium for Environmental Education and Training's EELink** will help guide K-12 teachers to useful EE materials that exist throughout the Internet, a network connecting thousands of computers at universities, government agencies and non-profit organizations around the world. The Internet provides a particularly rich supply of resources. EELink will also serve as an outlet for materials collected and produced by NCEET. Electronic versions of NCEET materials will be posted on EELink as they become available. All resources on EELink will be provided free of charge.

To order NetPower:
Fox Chapel Publishing
Box 7984
Lancaster, PA 17604
(800) 457-9112
Internet:
'NetPower1@aol.com'

— **The National Education and Technology Alliance,** a not-for-profit organization dedicated to promoting network use in education, offers a guide to on-line computer services called *Netpower: Resource Guide to On-line Computer Services.*

Florida Resources in Environmental Education (FREE) for Teachers
Florida Department of Education
Office of Environmental Education
325 West Gaines St.
Room 224 C
Tallahassee, FL 32399-0400
(904) 487-7900
In Florida: (800)342-3733

— **Florida Resources in Environmental Education,** a computerized clearinghouse developed by the State of Florida Office of Environmental Education, provides teachers in that state with on-line access to EE information. It consists of 5 databases: student conservation groups, EE speakers, funding opportunities, and EE materials, and programs.

Financial Support—Easy Money?!

This section identifies a variety of different funding sources. This list is not comprehensive. It is a grab bag of ideas that will hopefully lead you to other possibilities in and around your own community.

EE On a Shoestring

Not all projects or lessons will entail financial cost. In Unit One, for example, we presented the story of Lydia Hamn *("The Most Appealing Peanut")* who had her students just bring in a peanut, and that was the seed for an entire lesson. We also presented David Chapman *("Stories Connect Past and Future")* who used local newspaper articles and his skill as an educator to bring environmental themes into his classroom. In this unit, we introduce Mary Jo Terminello's story *("The Greening of Dania")*. When Mary Jo's third-grade students decided to "re-forest" their barren school grounds, they developed a "baggie brigade." Mary Jo sent them home with plastic sandwich bags and asked them to bring them back the next day filled with soil.

It is important to note that although you may experience difficulties funding your project, the resources DO exist... the challenge is finding them. When Sandra Jenore *("Where Do Carrots Come From?")* wanted to create a school garden in an adjacent lot for schoolchildren and families, she approached the Cornell Extension Service and the Parks Department for assistance. They sent seeds, tools, bulbs and flowers. To help cover the cost of her EE efforts, Mary Anne Challa *("Themes For a Lesson Plan")* applied for a small service learning grant from her school's P.T.A. And Sharon Ferriss' students *("Too Much Stuff")* asked the local Wal-Mart for financial support for their recycling program.

In-House Support

The best place to search for funds is with groups that will directly benefit from your program. For some, the search need not go further than their own classrooms. Gary Smith *("Have You Seen My Slender Salamander?")* and Seth Zuckerman *("Action For The Forest")* found that they had both talented fundraisers and successful entrepreneurs in their classrooms. Involving students in the financial aspects of program development can provide them with additional experiences and increase their level of commitment to the program. These teachers' innovative funding approaches illustrate basic techniques and approaches that can be adapted to meet local conditions and needs.

In addition, your school may have funds available for your project. In some schools, the P.T.S.A. and the Teachers Union award funds to innovative school-improvement projects.

Financial Support in Your Community

Local businesses and community organizations are a source of financial and professional support. Jerri Kelly *("Mangrove Monitor Madness")* received financial support for her EE efforts from local merchants, the County Soil and Water Conservation District, and the local Association for Excellence in Education. This section provides suggestions for how to approach your contacts and where to begin your search.

How to Approach Your Contacts

— **Identify a contact person.** In many cases it will take a few phone calls to locate the person who can give you the time and information you need.

— **Write a brief cover letter.** In the letter, explain why you are contacting the individual or organization. Share your vision. Describe how you see your program blossoming in the future. Talk about similar programs that have expanded to school-wide programs, regional endeavors, state projects or even national initiatives. Also, state that you would like to discuss the ideas in more detail at a later date, and that you will be contacting them on a certain day.

— **Make an appointment to discuss your proposal in person.** Meeting with an individual ensures that you will have the time you need to cover your ideas and questions.

— **Be prepared for your meeting.** Bring a detailed description of the program you intend to develop or implement. Show your enthusiasm. Let your audience know that you are serious about your plan, and that you value any information they can share.

— **Get a commitment.** Talk specifics and establish a definite role the particular individual or organization will provide.

— **Follow up.** Send a thank you letter and periodic updates about how your program is progressing. After all, it has become their program too.

Local Community Groups

The main idea to keep in mind when soliciting support is to approach organizations compatible with your program's needs. For example, when starting an Old World Garden at her school, Denise Leigh *("Okra's O.K.")* looked to the Museum of Natural History's "Seeds of Change" program for assistance. Other groups include:

— Religious organizations
— Garden clubs
— Urban greening groups
— Civic organizations like the Junior League, Kiwanis and the Jaycees
— The city forester
— Youth organizations like the Boy and Girl Scouts, and 4-H
— Professional associations, such as the National Association of Landscape Architects, and Air and Waste Management Associates
— Local chapters of national environmental groups such as the Sierra Club, The Nature Conservancy and The Audubon Society
— Local art groups

Local Businesses

Businesses are increasingly aware of the appeal of "green" activities on a growing body of "green" consumers. This awareness translates into a heightened willingness to fund high-profile EE programs. Local educators can utilize this opportunity to galvanize financial support for their environmental education programs.

While the largest employer in your region might be the best place to begin your search, the potential contributions of less-visible local firms should not be overlooked. Utility companies, for example, are often among the most supportive of environmental education. Bonnie Trusler's *("The Energy Patrol Strikes")* students monitor the school's energy consumption on a meter developed for the school by the local utility company. Examining your business community in your region should help identify a list of potential funding sources unique to your area. Here are some other ideas:

— Food store chains and restaurants
— Retail outlets
— Law firms and legal associations
— Local branch of a national company with environmental interests
— Local industry councils and the chamber of commerce
— Local television stations and other media
— Insurance companies
— Local hospitals, zoos and banks

Local Government

Local government offices– from the mayor's office to the city parks and recreation department– are often able to provide valuable financial assistance. While tight budgets make it difficult for local governments to provide direct funding, the advantages of developing a relationship with community leaders are substantial. It may be easier for agencies to fund projects that offer needed services to a particular segment of the community. Here are some other suggestions:

— City or county recycling coordinators
— The city commissioner and other officials' offices
— County agricultural centers, and water and conservation districts
— Local parks and nature preserves
— State and local museums

Workshops, Courses, and In-service Opportunities

EE workshops are an excellent way to increase your knowledge of environmental education. EE workshops are often offered by nature centers, museums, colleges and universities, and state natural resource agencies. Many school districts, intermediate school districts, and regional education service centers offer pre-service and in-service credits for attendance and are responsive to teacher requests for workshops. Contact a local nature center or museum, or your state's Department of Education Office of Environmental Education, Department of Natural Resources, or Environmental Education organization or association for a list of EE in-service opportunities in your state. See the resource indices at the end of this guide for those contact addresses.

Through the Eisenhower program, which focuses on raising the competency of U.S. high school graduates in science and math, the U.S. Department of Education offers financial support for in-classroom EE programs around the country. Often, such funds are available for teacher training.

This section identifies a variety of different workshops, courses, and in-service opportunities. Examples currently offered to teachers throughout the country include:

Coyote Point Museum for Environmental Education
1651 Coyote Point Drive
San Mateo, CA 94401
(415) 342-7755

— **The Coyote Point Museum** in San Mateo, California, hosts a variety of EE workshops for pre-kindergarten through 12th-grade teachers. Workshops emphasize hands-on, multidisciplinary activities and include topics from wildlife and forests to energy and nature photography. College credit is available.

Aspen Global Change Institute
100 East Francis Street
Aspen, CO 81611
(303) 925-7376

— **The Aspen Global Change Institute** is a forum for global change researchers to further understanding in global change science. The Institute offers workshops introducing teachers to various concepts of global change, including Ground Truth Studies. AGCI also provides teachers with support materials such as remotely sensed images and educational videos.

Three Circles Center for Multi-Cultural Environmental Education
P.O. Box 1946
Sausalito, CA 94965
(415) 331-4540

— **The Three Circles Center for Multi-Cultural Environmental Education** serves to introduce, encourage and cultivate multicultural perspectives and values in environmental and outdoor education, recreation, and interpretation. TCC offers workshops and in-service training in the development of programs and curriculum to better meet the needs of culturally diverse populations.

SEPUP
Lawrence Hall of Science
University of California
Berkeley, CA 94720
(510) 642-8718

— **The Science Education for Public Understanding Program (SEPUP),** provides summer trainings and workshops throughout the country for middle and high school teachers. SEPUP educational materials use societal issues as a focus on how science and technology can be used as a basis for evidence based decision making. Some of the module topics are: Plastics in Our Lives; Household Chemicals; The Waste Hierarchy: Where is AWAY?

Project Learning Tree
1111 19th Street NW, Suite 800
Washington, DC 20036
(202) 463-2462

Project WILD
5430 Grosvenor Lane
Bethesda, MD 20814
(301) 493-5447

Project WET
201 Culbertson Hall
Montana State University
Bozeman, MT 59717
(406) 994-5392

— **Project Learning Tree (PLT), Project WILD and Project WET** are three examples of nationwide EE programs that offer training workshops on the use of their environmental education materials. PLT is an interdisciplinary curriculum which uses trees as the vehicle for exploring our use of forest resources. Project WILD is a set of interdisciplinary activities based on wildlife, animal ecology, and the human connection to wild animals. Project WET is a set of interdisciplinary activities based on water quality and water ecosystems. In each case, a six hour training workshop is required in order for teachers to be allowed to use curriculum materials. Workshops are coordinated by the PLT, WILD, or WET coordinator in your state. Contact the PLT, WILD, or WET national office or your state's EE Association or Organization, Department of Education EE Coordinator, or Department of Natural Resources for the name of the PLT, WILD, or WET coordinator in your state. See the resource indices at the end of this guide for those addresses.

Investigating and Evaluating Environmental Issues and Actions–IEEIA
Department of Curriculum and Instruction
Southern Illinois University
Carbondale, IL 62901
(618) 453-4214

— **The Department of Curriculum and Instruction at Southern Illinois University** offers teacher training designed around "Investigating and Evaluating Environmental Issues and Actions," a curriculum development project designed to teach students how to investigate and evaluate science-related social issues. (See *"Empowering Emily"*).

Department of Environmental Studies and Planning
Sonoma State University
1801 E. Cotati Avenue
Rohnert Park, CA 94928
(707) 664-2306

— **The Department of Environmental Studies and Planning at Sonoma State University** offers a wide variety of workshops for kindergarten through 12th-grade teachers. Workshops emphasize hands-on resources. The on-campus Earth Lab, which is used extensively for teacher training, features demonstrations of sustainable agriculture and energy.

Learning Resources Center
Wisconsin Center for
Environmental Education
University of Wisconsin-Stevens Point
Stevens Point, WI 54481-3897
(715) 346-4973

— **The University of Wisconsin–Stevens Point** offers a series of graduate credit courses for teachers in environmental education. Courses are offered across the state by professional environmental educators, trained as ad hoc faculty. On-campus summer courses enable teachers to earn a masters degree in EE. Many colleges and universities, especially those with extension programs, offer evening, weekend and summer courses for in-service teachers.

National Diffusion Network
Recognition Division
U.S. Department of Education
OERI/PIP/Recognition Division
Room 510 East
555 New Jersey Avenue N.W.
Washington, DC 20208-5645
(202) 219-2134

WOW!: The Wonders of Wetlands
Environmental Concern, Inc.
P.O. Box P
St. Michaels, MD 21663
(410) 745-9620

— **The National Diffusion Network** is an organization that shares successful education programs among public and private schools, colleges and other institutions. Administered by the U.S. Department of Education, the NDN provides funds to distribute information about exemplary programs to schools across the country. The NDN coordinator in your state can give you information about how to bring a workshop to your area.

— **WOW!: The Wonders of Wetlands** is a 160 page comprehensive educators' guide that provides multidisciplinary classroom and outdoor learning activities for all grade levels. It includes over 40 activities exploring different wetland types, soils, water, plants, and current issues, as well as sample hands-on restoration and enhancement projects. The curriculum guide is supported by national teacher training workshops administered by Environmental Concern, Inc. [In late 1994 Environmental Concern, Inc. will join resources with National Project WET to re-issue WOW!: The Wonders of Wetlands as the Wetland Discovery Module, a supplement to the Project WET Curriculum & Activity Guide.]

"Z" is For Zero-Waste

Level
– Lower Elementary

Story Focus
– Locating Instructional Resources

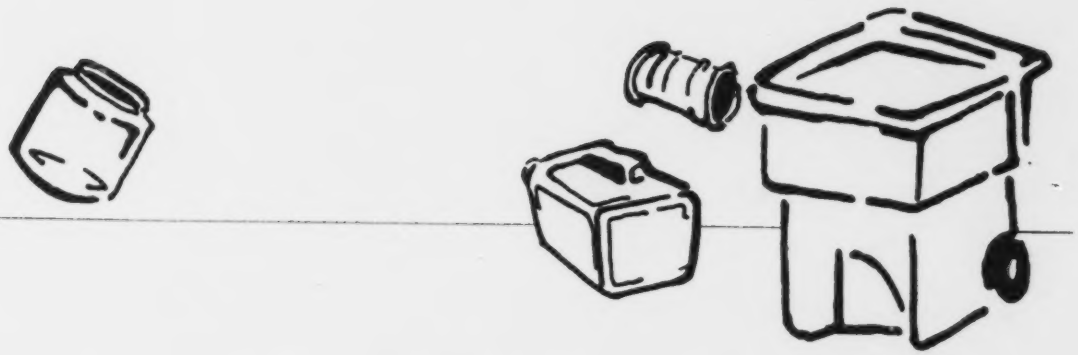
"Now I know my environmental A-B-C's, next time won't you sing with me!" Wait, was that "*environmental* A-B-C's?" We are all familiar with the tune, but Leslie Dahlquist has changed the words to reflect the times. Rather than "A is for Apple" and "B is for Ball," her kindergarten and first-graders' A-B-C's begin with "A is for Aluminum." The first week in school, they learn about recycling and practice it all year long. Each week, Leslie introduces a new letter and a new environmental subject to study.

Leslie began integrating environmental education into her classroom eight years ago. Since that time she has created activities such as "pennies for ecology" (students bring in pennies to be used in math lessons and then collect them to use to buy trees for the school), and planted an organic vegetable garden on school property. Three years ago, she used the children's creativity (all artwork was made by the children), along with her own, to develop the environmental A-B-C book. She has since used it as a guideline for the entire school year, using it to plan lessons that connect and integrate material from various subjects.

The book covers many topics, introduces vocabulary, and presents activities for the week. "C," for example, is for carpool. That week, the children learn about alternative transportation methods and experiment with different ways of getting to school and other places.

Leslie Dahlquist
Topanga School
141 North Topanga Canyon Boulevard
Topanga, California 90290

In addition, the curriculum covers social studies and science. "E," for example, is for endangered and the class usually adopts "Patches," a humpback whale, an endangered species. They imagine and plot Patches' migration route on a map and talk about the dangers and threats Patches faces along the way. "H" stands for helium, leading the class to a discussion of the threats that released helium-filled balloons pose to wildlife. The students consider the suffocation risk for sea life that mistakenly eat balloons.



"J" is for junk. This letter begins a discussion about landfills and incinerators and the growing problem of finding a suitable place to put our garbage. The children question what garbage is, and gain an understanding that many things thought of as garbage are good for other uses when recycled or otherwise re-used. This leads to "trade your junk day," when students bring their "junk" to trade with others who may want it. Of course, they quickly realize that one child's junk is another's treasure.

"Rather than **A is for Apple** and **B is for Ball,** her kindergarten and first-graders' A-B-C's begin with **A is for Aluminum.**"

"Q" is for quality. This week the children refresh their knowledge of recycling and garbage as they introduce issues relating to math, business, science and art. They talk about items they buy that last long and those that don't, and try to find the differences in them. Issues of goods, services, production and price are introduced.

The object of the last week of the school-year is to produce zero or as little waste as possible: "'Z" is for zero-waste. The week culminates with a zero-waste lunch, in which the whole school participates. By then, Leslie Dahlquist's students have certainly learned much more than their A-B-C's. ■

Learning on the Job

Level
- Middle School

Story Focus
- Enlisting Administrative Support
- Locating Instructional Resources
- Networking With Other Educators

John Scheer occasionally describes his teaching as taking off into parts unknown. "We never let not knowing stop us," he says. "One of our objectives at Phelps School is to focus on student interests, even if it means teaching a course we're not entirely comfortable with. In such cases, I simply learn right along with my students."

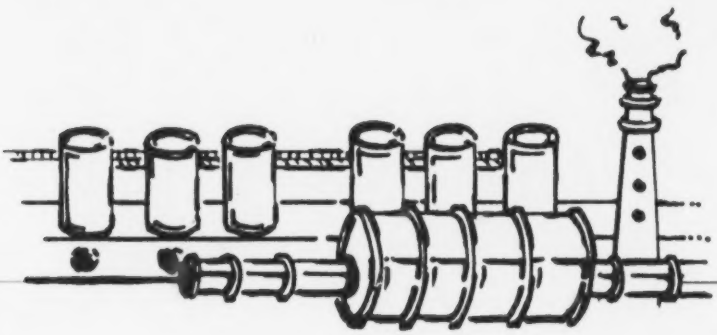
John says this was the case with an environmental course he recently co-taught with Wes Leggett, the media teacher.

Originally, the course grew out of a concern for water quality. A number of students who lived close to the nearby Fassnight Creek were dismayed by the creek's looks and smells and wanted to do something about it. In particular, says John, "there was a lot of oil scum on the surface of the water and a great deal of garbage along its banks. The students had all kinds of questions about how it effects the environment and the animals that live by the creek."

Even though John knew little about the creek's problems, it seemed like a worthwhile investigation to continue, in part because the kids were so excited. "I had to do my homework along with the students," says John. "Plus, I talked quite a bit with the former teacher of the course." With so many issues affecting water quality, the students had their hands full. The school didn't have the equipment to analyze water quality in the creek, but they were able to team up with the city to run tests. In addition to oil and garbage, they found the creek was overloaded with nutrients. They also discovered plans to further channelize it.

John Scheer
Phelps Center for the Gifted
Springfield, Missouri 65806-3397

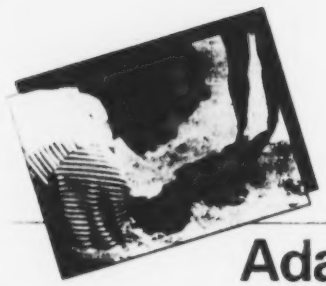
The students gathered their information, assembled spokespeople and headed to a city council meeting to argue for tighter zoning around the creek. Since then, some students have created pamphlets explaining different ways to help clean up the creek, while others have made educational videos now used by the Missouri Department of Conservation. "It's really rewarding for me to see the students' growth and commitment to solving some of these problems," John says.

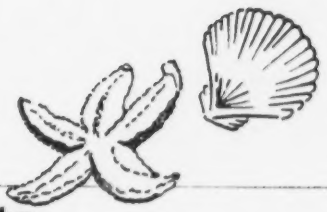


"Sometimes the issues of our class are more personal, as well," John adds. "When we were looking at another creek this year in comparison to Fassnight Creek, one of the students found a goldfish amongst a school of minnows. This set off a discussion on what it feels like to be unique and different. Just by coming to this school, students often get labeled as 'geeks' or 'encyclopedia heads'. So we spent the hour talking about what it feels like to be different, how prejudices are perpetuated and what some of the coping skills are. I think it was a valuable discussion, one that fit well with our curriculum goals.

"We work hard to find the interests of our students, and build on these interests and strengths. It's a little different style of teaching: You have to be open and willing to move from one thing to another. Once you get involved, you find a whole new joy in teaching, and the students are thriving as well." ■

"It's a little different style of teaching: you have to be **open and willing** to move from one thing to another. Once you **get involved,** you find a whole new joy in teaching, and the **students are thriving** as well."





Adapting Assignments

Level
- Middle School

Story Focus
- Locating Instructional Resources
- Enlisting Community Support

As you approach Tim Fowler's science classroom, the walls are covered with posters of the Chesapeake Bay. Oysters filter water for plankton meals, people fish along the shore, blue crabs wave a claw and a deer bounds for cover. Inside, students are busy working in groups around small, black lab tables.

"Let's keep it down," Tim reminds the class. "Talking louder won't tell you who eats oysters, Adam, you'll have to look it up." Tim strolls through the groups and checks their Bay food web.

Tim teaches in Baltimore, Maryland, where the Chesapeake Bay impacts local industries, transportation and recreation. It is also a huge, dynamic, threatened estuarine ecosystem. Tim's curriculum helps the students identify the animals and plants that live there, and, in some cases (like the crayfish), to observe them.

"Science texts, even when the topic is the environment, don't do a good enough job helping kids understand the complexities of the real world," Tim says. "The typical approach is to separate the animals from their environment. Students are asked to count crayfish legs and learn where eggs are carried. The texts don't help kids learn how the animal interacts with others, where it lives or where it hides. Students also need to know about human uses of the Bay, nutrient loading, shipping channels, and over-fishing. Since this information isn't in the science books, I add it."

Tim Fowler
Pikesville Middle School
7701 Seven-Mile Land
Baltimore, Maryland 21208

In this four week unit, Tim's classes explore topics with exercises, discussions and research projects. The adventure culminates in a group task, where students design a poster of the Bay, identifying at least 15 organisms and placing them in their proper habitat. They also create accurate food webs for the same organisms. His only requirements are that the posters include phytoplankton, zooplankton and a human. Posters help students integrate the different parts of the Bay they have studied.

"It might sound simple, but it is a difficult assignment," Tim says. "They have to hunt through the reference materials before they can be sure about what a blue crab eats."

Tim adapted this activity from the standard Baltimore County curriculum materials. In its original form, it was an optional art activity. Worksheets for the new activity came from the Chesapeake Bay Foundation, a local environmental organization. Tim added constraints, demanded accuracy, and put the students in small groups. He prefers to change individual activities into cooperative group exercises to help students learn cooperative skills. Listening, sharing, leading and being responsible are just as important as measuring and hypothesizing, and often make an assignment more interesting and fun. Tim created roles for each group member to help guide their task.

"Students also need to know about human uses of the Bay, **nutrient loading, shipping channels,** and **over-fishing.**"

Tim's five classes range from gifted students to potential drop-outs, so he further adapts the assignment for each. Small changes create something that is challenging yet achievable. "Some classes are given a diagram of the Bay and they fill in the organisms," Tim says. "Others draw their own, and sometimes get quite creative. Two groups this year are trying an aerial view. I don't know if they'll be able to portray three habitats or not." More complex interactions are expected in the food webs designed by the gifted class.

It is a simple adaptation, and well worth the additional monitoring and coaching, Tim says. "The students practice research skills, communication skills, and most keep their notebooks in better shape. They are proud of what they see hanging in the hallway." ■

Who's Park Is This?

"What do you think you'll find in the park?" Bernice asked her 5- and 6-year-old students. "Birds!" shouted an enthusiastic girl. "Squirrels!" responded an eager, red-haired boy next to her. Bernice's class was charged up for their field trip to Central Park—in search of wildlife in the middle of New York City!

But when they arrived at the park that April morning, what did they find? GARBAGE!

Level
– Lower Elementary

Story Focus
– Locating Instructional Resources

"This is yucky," said one student.

"It smells," chimed another.

"Well, who do you think made this mess?," Bernice asked the class.

"People," they responded.

"And who makes trash?"

"People."

"And are we people?"

"YES."

"And whose park is this?"

Hesitation… "Ummmm…"

Bernice Hauser
Horace Mann-Barnard School
231 W 246th St.
Bronx, New York 10471

And so began Bernice Hauser's garbage unit with her students at Horace Mann– Barnard School in the Bronx. Later, Bernice led the children back to Central Park, where they donned plastic bags like gloves and cleaned up the trash they found on their first visit: tissues, gum wrappers, cigarette butts, paper, cans, bottles and more. "Where does your trash go?" Bernice asked the busy students. "In the waste basket," came the response. "And what happens to it after that?" Student shrugs all around: "It just goes away… "

Back at school, a guest speaker from the NYC Department of Sanitation helped the students classify the trash. The students drew a "kids-eye view" map of Central Park on a long roll of butcher paper and glued bits of the garbage onto the map.

Bernice asked students to think back to their visits to the park and the map that they had just made. She asked them to imagine what they would include in the ideal kid's park. After a slight pause, there was a flurry of raised hands. The students came up with a wonderful assortment of design ideas, including agoldfish pond, lots of benches and other places to sit, numerous winding paths, a miniature zoo, a playground where walls could be assembled and then torn down, and even separate play areas for younger and older kids. The class topped off this exercise by building a scale model of their ideal park—it was, of course, a park without trash.

"Where does your trash go?" Bernice asked the busy students. **"In the waste basket,"** came the response. **"And what happens to it after that?"** Student shrugs all around: **"It just goes away..."**

In another lesson, students were asked to keep track of one week of classroom garbage. The trash was kept in a large bag. At the end of the week, the whole class gathered around the full sack. They weighed it and took turns feeling the contents through the plastic. The bag was then opened. Bernice had plans for this garbage.

The garbage was put to many creative uses. Some garbage went into the students' growing Garbage Museum, displaying the kinds of waste found in the classroom and around the school. Other pieces were taken by students and used to make small presents for their parents. Some students separated out the paper and made new paper. One group of students made a set of chairs out of empty soda cans. Another enterprising group built models of the World Trade Center's Twin Towers out of empty juice boxes. ■

Spilled Oil Spreads Science

When the Exxon Valdez spewed raw crude into the Prince William Sound, Gary Holsten and several other teachers in the Mat-su Valley recognized an opportunity amidst the tragedy. Over coffee in Gary's kitchen they hatched a plan to involve several students in a study of the impact of the oil and the oil clean-up process on intertidal animals.

Level
- Middle School

Story Focus
- Locating Instructional Resources
- Networking With Other Educators
- Locating Funding: Grantwriting

With financial support from the Alaska Sea Grant program, Gary took five students from the regional middle school gifted and talented program to three sites in the Sound. The high profile of the spill meant wide-spread publicity for Gary and his students. As a result, other teachers expressed interest in teaming up with Gary, and plans were made for a larger follow-up study.

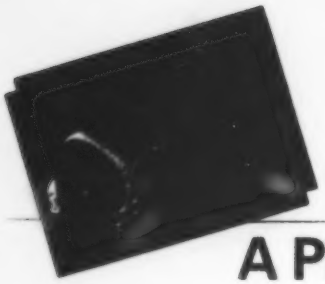
The following spring, Gary and fifteen students traveled to Juneau to discuss their test designs with marine biologists at the National Oceanic and Atmospheric Administration, NOAA. Even though three decades divided their ages, the students and scientists amazed each other with the quality of the discussion. That interaction defined the project for the next three years.

"An important aspect of the program was that students made critical decisions affecting the program," Gary explains. "They made decisions about test sites, they defined research questions, they involved other students from Native schools and from Massachusetts, and they did the work. I merely provided guidance from time to time, helped with housing arrangements, and cut some of the red tape."

Gary Holsten
HC03, Box 8090
Palmer, Alaska 99645

By the third year their beach transect procedure was well enough established that their elegantly simple studies were producing valuable data. "The students were surprised to discover that 80 years of logging and shipping activity can devastate the intertidal community more severely than the Exxon spill," Gary explains.

The project was a wonderful learning experience for Gary's students. "Over the course of the project the students learned not only about science and the environment, but about the real world too." ■



A Picture Tells a Thousand Stories

Level
– Elementary

Story Focus
– Locating Instructional Resources

Some people wouldn't consider reading picture books to be environmental education. But Susie Williams believes it can be.

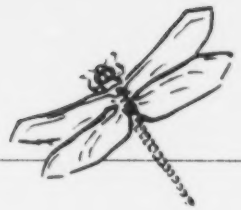
Susie teaches at Wheeler School, a private nursery-through-12th- grade school in Providence, Rhode Island. "The main thing is that we allow as many students as possible to feel their connectedness to all living things, and that this begin at an early age. At the primary school level, if I can give each student some respect for other living things, I feel successful. And this will help prepare them to learn other, more detailed knowledge later in their academic life," she says.

Susie is a "special subject" teacher at Wheeler, which means that she travels from room to room. She integrates science, literature, environmental education and art by developing students' animal classification skills, questioning abilities, and systems of value. "To teach the children about nature, I recently added picture books to my unit on live animals," Susie says. "I think they are a great way to address the values that are such an important part of environmental education without being preachy. They also allow me to combine science and good literature. Once a week I bring in a live animal and supplement it with a story about that animal. For example, *"The Salamander Room"* would supplement live salamanders.

"I've brought in worms, snakes, crickets, crayfish and chickens. I usually ask the kids to discuss the story about the animal and perhaps make an accurate drawing or careful observations. To teach the value of living things is difficult in an urban setting like this. It's easier and more lasting if one can instill this attitude through the students' interaction with live animals."

Susie Williams
Wheeler School
216 Hope Street
Providence, Rhode Island 02906

Formerly the director of a nature center, Susie has a long background in environmental education. She stresses the importance of knowledge and disbanding stereotypes. "One of my greatest triumphs is when some little girl enters my classroom with the uninformed position that 'worms are gross' and leaves with some idea of the purpose of worms in a natural ecosystem." She pauses in thought. "No, that sounds more complicated than it really needs to be. I'm happy when a child leaves my class fascinated by the interesting adaptations of even a lowly worm."



With that, she pulls a stack of paper out of her backpack. "Take a look at these. These are some of the students' drawings of the worms I brought in today," she says.

"I'm happy when a child **leaves my class fascinated** by the interesting adaptations of even a lowly worm."

At first glance, the thick pencil lines on manila paper of the drawing look simple and awkward. On closer inspection, there is surprising sophistication. The drawing shows a "front" and a "tail," an egg sack and bristles that hold the worm in its hole. There is also a diagram showing the undulating movement of the earthworm, showing some knowledge of how a worm's body is constructed, and how it moves.

Susie puts away the drawings and gets up to leave. "Really, I believe that there is some ultimate importance to maintaining lines of communication between young children and the natural world, especially in an urban setting. Kids start out with an innate love and empathy for other creatures. It is integral to later environmental education to keep that love, or sense of connectedness, alive in children, so that they are open to receiving more complicated knowledge as they grow older." ■

The Energy Patrol Strikes

Level
- Upper Elementary

Story Focus
- Enlisting Community Support
- Locating Instructional Resources

The Energy Patrol at Kimbark Elementary School doesn't just study the environment, it works on it.

Every morning, these fifth-graders check the kilowatt counter, a digital meter developed for the school by the Southern California Edison Company. They update charts to calculate how much energy was consumed. At the end of morning announcements, the Energy Patrol gives students a daily tip on how to conserve energy. The students write the text themselves.

Kimbark is an environmental education magnet school, recognized as one of 10 exemplary schools nationwide by the National Science Foundation. Each grade has an environmental theme, and each year, fifth-graders work on energy conservation projects. Bonnie Trusler, the environmental education resource person at the school, describes the fifth-graders' most successful project, The Reminder. Students wrote up a school-wide notice that said, "If you leave the lights on in your classroom during recess or lunch hour, you'll return to find the room dark, and there will be a student-designed notice next to the switch plate, which admonishes: OOPS! You forgot to turn off your lights!"

In one year of operation, the kids of Energy Patrol helped reduce consumption of electricity at Kimbark by about 25 percent, saving the school thousands of dollars. One student helped her mother, a worker at the local post office, set up an Energy Patrol at her worksite.

Bonnie Trusler
Kimbark Elementary School
19021 Kenwood Ave.
San Bernardino, California 92407

In addition to the Energy Patrol, the students are working to organize an annual weeklong energy fair. During the fair, fifth-graders will teach younger students about energy conservation. The goal is to foster conservation at home, and each of the younger students will receive an energy workbook to complete with their families. Parents will sign off when the workbook is completed, and back at school the Energy Patrol will award conservation "merit badges" to their environmental proteges.

Although Bonnie gives the Energy Patrol guidance, it's up to them to think up and develop ideas. Although Bonnie says it takes more time to do things this way, she says it's well worth the effort because the ideas are theirs, and so are the results. "Helping kids know they can make a difference" is one of Bonnie's main goals. ■

The Greening of Dania

Level
- Upper Elementary

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources
- Locating Funding: Fundraising

When Mary Jo Terminello began teaching third grade at Dania Elementary School in southern Florida, the campus was a virtual desert. Bereft of topsoil, with few trees or shrubs and no budget for landscaping, the school might as well have been in a logged-over rainforest or Sub-Saharan Africa. Undaunted, Mary Jo turned her students into a "baggie brigade," sending them home with plastic bags for them to fill with earth. The children dumped the soil into planters in Terminello's classroom, which is where the greening of the school began.

Several years later, in 1989, the program expanded to cover the entire school. With every bag they brought, the students put their names on a paper leaf that they hung on a "tree" in the art room. Sack by sack, each class filled a concrete planter with soil. When they needed money for seedlings, Mary Jo's students made terrariums out of two-liter soda bottles and Christmas decorations out of palms, and sold them to raise money. During one school year alone, 600 plants, and 60 trees and shrubs, were planted as a result of the program.

Before long, the students—and even Mary Jo herself—found their deeds guiding their thoughts, she says. Once they started to see that their actions could really make a difference, they felt a greater responsibility to the environment and branched out into other ecological endeavors. They brought their plastic to school for recycling, and got a picnic table—made from the same recycled plastic—from the company that collects it. They teamed up with the local high school to reprocess telephone books. Students took to letter-writing, cable-TV appearances and city hall meetings to press the local government to start a city-wide recycling program.

Ultimately, the students distilled their loyalty to the environment into a pledge they recite every morning after the Pledge of Allegiance:

> ***"We of Dania elementary, pledge to take good care of our water, space, air and land. We want to help the Earth by planting flowers and trees. The environment needs our help, so we won't pollute and we won't litter. We pledge to take good care, because we want our children and ourselves to grow up in a clean world."***

Mary J Terminello
Dania Elementary School
300 S.E. Second Ave.
Dania, Florida 33004

This rising tide of environmental action seems to be having an effect. Mary Jo tells of parents who come to confer with her. They say, "Oh, so you're the teacher who is responsible for my children telling me at the store 'Don't buy that, mommy,' or 'Recycle that, mommy!'" ■

Mangrove Monitor Madness

Level
- Middle School

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Networking With Other Educators
- Locating Funding: Grantwriting

"Come on over here." Jerri motioned us towards the center of a very large room filled with all kinds of noises, including several different bird calls. We could also see and hear a cascade of water, and sure enough in the center of the room was an indoor pond, complete with a fountain, a waterfall, rocks, vegetation and sand beach. "The kids worked on this habitat," she says. "They research and build habitats for animals. This one is designed for the caiman, a type of small alligator. Right now, there're tadpoles in there. Do you see them?" she asks.

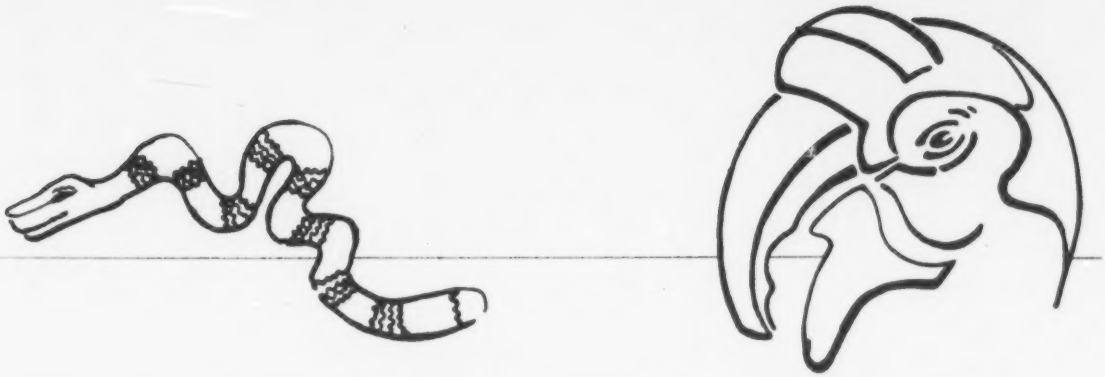
As we looked, we could see the tadpoles. A few were well on their way to becoming frogs. "It's really exciting," Jerri says. "Most kids never see the transformation of tadpoles to frogs or caterpillars to butterflies. Outside we also have a butterfly garden. We have an aviary out there, too, and we're building a greenhouse. It's not that we have any great overall plan here. It's just what we're doing and it keeps growing."

They now have sixty animals in the lab. "We have a beehive, a squirrel, raccoons, hamsters, an albino ferret. We have snakes, lizards, turtles, an iguana, prairie dogs, rabbits, a chinchilla. A chinchilla is a type of South American rodent," she explains. "You might have heard of chinchilla fur, used for coats. The students think they're really cute."

Jerri Kelly
Milam Intermediate School
720 West Jefferson St.
Tupelo, Mississippi 38801

"The kids do all the feeding around here, but only the brave ones will feed our mangrove monitor," Jerri continues. "It's a two-and-a-half foot lizard. He lives in a 75-gallon aquarium and the kids flock towards him. He eats six white rats a week, and many children don't understand why we need to feed him these. This of course is a nice occasion to explain the food chain." Jerri chuckles and adds,"I also ask them what they eat, and we talk about the cows and chickens we all eat for dinner. It's important that they see where they stand in the food chain, too."

The seeds for this lab began several years ago, when Jerri, who was then a language arts teacher, brought an aquarium, a hamster and a bird into her class. "I was amazed," she explains. "It had such a motivating effect on the children. They calmed down and got to work, just so they could have time to hold and look at the animals. Kids love the opportunity to be with animals." Jerri would occasionally buy another animal and then people started to donate them. "It just kept growing and we brought in as many animals as possible for our small classroom. Kids from the entire school were eager to look at the animals. 'Ms. Kelly,' they were constantly asking, 'can we come over to your room'?"



"Finally, three years ago, the school administration let me expand into an outdoor space and asked me to teach science. That was at King School. We built a beautiful outdoor classroom there, with a small pond, windmill, bird feeders, benches and a rock garden. It was a lovely space," Jerri says.

But the big change came last year, when Jerri's sixth-grade class moved into a new building. The building, the old junior high school, has a lot more space. Dr. Mike Walters, the Superintendent of Tupelo, Mississippi, Public Schools, had requested that Jerri set up an animal lab for the whole school. Jerri eagerly began the project. They gave her an area that had been two adjacent industrial shops and knocked a hole in the separating wall for a door. Now one side is Jerry's classroom and the other is the animal lab. It took all summer and many nights this fall to get it all set up. Monetary support came from the Tupelo Association for Excellence in Education, the Lee County Soil and Water Conservation District, local merchants, the principal and the maintenance staff.

"I also ask them what they eat, and **we talk about the** cows and chickens we all eat for dinner. It's important that they see where they stand in the **food chain,** too."

All the teachers at Milam Intermediate School are encouraged to use the lab. Naturally, it fits with science classes, but English teachers use it for descriptive writing exercises and even the art teacher has a project designed where students create banners showing the habitat of their favorite animal. Not only does every child in the school visit the lab, but several other schools visit on a weekly basis. Some teachers have designed units around the lab, and when students visit, they rotate through the four stations: video center, laser disc/listening center, indoor animal space and outdoor animal space.

"The whole process has been amazing," Jerri says. "And it's changed my philosophy of teaching. Kids in my classes now experience hands-on learning. They feed, clean, hold animals, write down their observations, research in the library, visit the listening or video center in the lab, and it seems to meet the needs of every child.

"Further, you just can't imagine what a joy it is to teach when you see students' eyes light up and you see so many smiles." ■

Big Sky Country Expeditions

Level
- Middle School

Story Focus
- Enlisting Community Support
- Locating Instructional Resources
- Building Skills: Workshops, Courses, Inservice
- Networking With Other Educators

Most parents of Sheridan Elementary school students are farmers or talc miners. A few are loggers. And even though Sheridan, Montana, is but a few hours from Yellowstone National Park, few tourists travel through this valley.

"To say the word 'environment' means 'environmentalist' to most people around here," says sixth-grade teacher David Marsh. "And that means no logging, no mining, and too much wilderness. I wouldn't get very far if that's what they thought environmental education was all about. But I try to help kids understand that everybody has to have a little bit of environmentalist in them to take care of what we have around us. That's true for loggers and ranchers, too."

Taking care of what we have and enjoying our environment is the theme of David's fourth-quarter science program. It's divided into units on local conservation and utilization of resources.

"It is important to start our study with the orienteering unit and a recreational aspect of our environment," says David, who takes students trap shooting and fly casting after they study gun and water safety. "Enjoying the environment is one reason to keep it. Some youngsters return to these sports for a lifetime of enjoyment."

David Marsh
Sheridan Elementary
P.O. Box 586
Sheridan, Montana 59749

Guest speakers from the Fish and Game Commission spend time with the students. Talks include a history of game management, the return of the buffalo, boating and fish research. After a unit that includes groundwater, stream nutrients and aquatic habitats, a field trip takes students to shock fish, weigh them, age them and take scale samples.

Other speakers are provided by the Soil Conservation Service and US Forest Service. This outside support is critical to the success of David's program.

Between guest speakers, readings and field trips, David uses about 25 Project WILD activities to reinforce concepts, teach about life cycle strategies and have fun. These short activities work well in combination and help him design a series of interactive lessons. David has used Project WILD for many years and became a facilitator to help introduce other teachers to the materials. The school board supported his work on the project even when it meant missing a school day.

Sheridan has its share of environmental problems. Fertilizers from farms can contaminate the river, and a clear-cut logging operation upstream sometimes produces a heavy sediment load. David leads class discussions on these topics. "The discussions are really animated since the kid's families are integrally involved with one aspect of the environment or another," recalls David.

But David believes controversy breeds more discussion. Most of his students aren't fanatical and are willing, maybe even anxious, to find a compromise. "When we finish a particular topic," David says, "it's easy to see that the only solution is to strike a happy medium, so that everyone can prosper." ■

Empowering Emily

Level
- Middle School

Story Focus
- Building Skills: Workshops, Courses, Inservice
- Locating Funding: Grantwriting

On a whim, Karen Kenna decided to spend part of the money she received for a hands-on math and science grant to attend an Investigation and Evaluation of Environmental Issues and Actions workshop.

The very next fall, she started applying her new teaching techniques in class. Karen and her sixth-grade students built an in-class reference file on the environment. They built landfill and compost columns in the room. They went on field trips to recycling stations and landfills. They even picked apart their lunches, analyzing where things came from and how much is wasted.

"I began to look at myself as more of a facilitator of resources and much less as a source of information," says Karen, who was first motivated to attend the workshop because of her frustration about the lack of environmental material in textbooks. "I mean... come on... here I was a new teacher enthusiastic about doing environmental education, and I could have covered all the information presented in the assigned textbook about the environment in a single day. The IEEIA program totally changed my perspective, and it's had a major impact on the way that I teach." IEEIA runs workshops to teach the skills and knowledge needed to implement a hands-on environmental education program.

Karen pauses for a moment and pulls out a frayed photograph of her sixth-grade class. She points to a tiny blonde in the second row. "That's Emily. When the class was assigned a research project involving a paper and a presentation, Emily snatched up the topic of animal rights from some information which I'd brought in, and really did an incredible job. She wrote letters to Colgate-Palmolive, Revlon, L'Oreal and Ralston Purina asking them about their animal testing policies, receiving responses from all of them. She also received information from an animal rights activist group, complete with graphic pictures showing the inhumane treatment of animals.

Karen Kenna
Thoreau Middle School
2505 Cedar Lane
Vienna, Virginia 22180

"What impressed both the class and myself during the presentation was that she not only offered information, she also had an action plan ready. She had prepared a list of companies that test their products on animals, asking those in the classroom to boycott those products. Her final portfolio consisted of her formal research paper, a list of primary and secondary sources, and a bibliography. An amazing level of interest and commitment from someone so young."

After attending that first workshop, Karen has served as a facilitator for IEEIA for two years and also for Kraft General Foods' "Solid Thinking About Solid Wastes" educational program, which is modeled after IEEIA. "I've thought about moving on to teaching at the university level, but I get so much out of teaching my younger students. I really think that we grossly underestimate the power of kids this age." Karen says. "I mean, just look at Emily."

"I began to look at myself as more of a **facilitator of resources** and much less as a source of information."

Her present class is busy learning about local environmental issues, including the Chesapeake Bay's problems. "We've recently built a model of an estuarine ecosystem in the classroom. It's very valuable to break down and talk about the environment that surrounds these kids. It helps students become methodical thinkers and develop problem-solving skills that are both transferable and lifelong. I like to believe that students walk out of my classroom with a sense of hope and purpose, that all is not gloom and doom, and that they themselves are the keys to the equation." ■

Things That Aren't Supposed to Be There

Vicki Rich uses her school's five-acre Wooster, Ohio grounds as an environmental classroom. Outside, she leads her third-grade students on a search for "things that aren't supposed to be there."

In the school's playing fields, parking lots and woods, they collect paper, plastic and other trash. One year, a student found a rusty, old wrench. Another group discovered a sharp chunk of metal jutting up from the ground. Working together to dig it up, students and teachers discovered it was an engine. The day after this treasure hunt, Vicki invites a community recycling program representative to discuss with her class the difference between recyclable and non–recyclable materials.

Level
- Upper Elementary

Story Focus
- Enlisting Community Support
- Locating Instructional Resources

Before sending away all those "things that aren't supposed to be there," Vicki leads an art project. The students use their found objects to build sculptures. "They're usually pretty abstract," says Vicki. Once appropriately admired by the other classes in the school, the artwork is dismantled and the objects divided into appropriate categories: natural objects go back to the woods, recyclables go to the recycling center. Trash is disposed of properly. The student who found the wrench managed to trade it for a new one at the hardware store.

Vicki Rich
Wooster Township Elementary School
1071 Dover Road
Wooster, Ohio 44691

Vicki's hunt is just one of many environmental activities she leads during the school year. Years ago, she started small, adding environmental words to her language arts lessons, and reading environmental fables like Bill Peet's "The Wump World." One year, she asked students to write themes on the topic of 'How I See Today's World, and How I Would Change It.' Going to the library, looking up organizations that offer environmental curricula and writing for information generated a wealth of material. So much, she had no trouble creating a one-week, multidisciplinary environmental unit. Now Vicki uses a variety of resources and weaves environmental themes throughout her curriculum. "I wanted to add ideas that my students would find relevant and which would supplement the textbook," she says.

Vicki's unit meets all district standards. She addresses the environment while meeting objectives in art, math, science and language arts. Each year, she changes some elements, keeping activities that work particularly well. She has so much material and so many ideas, she says she could teach an entirely different unit each year. All it took to get started was an interest in going beyond the textbook. ■

Unit 3
Taking the Next Step

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Taking the Next Step

Jerri Kelly's *("Mangrove Monitor Madness")* environmental education efforts began a few years ago when she brought an aquarium, a hamster and a bird into her sixth-grade language arts class. Last year, at the request of the school superintendent, Jerri expanded her animal lab for use by the entire school. It now includes nearly 60 animals, including an iguana, a chinchilla and a 2 1/2-foot lizard.

Although the next step in your EE effort may not be as dramatic as Jerri's, improving and expanding your EE lesson, unit or program is likely to involve additional steps to those mentioned in Unit 2. Three of these steps are covered in this unit.

The first, "Networking," suggests ways to meet other environmental educators. Other teachers are often the best source for information pertaining to resources and programs available in your area. Networking is a way for you to share your efforts. The "Grantwriting" section details the process of researching sources of grants and applying for them. "A Pat on the Back" lists awards, scholarships and stipends given out each year to deserving environmental educators.

Networking: Meeting Other Environmental Educators

Other educators are an important resource to consider as you build your EE lesson, unit or program. Other educators can help you locate curriculum materials, overcome bureaucratic hurdles, and find funding, workshops and experts in your area. You may also become a resource for other educators trying to bring EE into their classrooms.

Professional Organizations for Environmental Educators

Professional organizations for environmental educators often exist at the state and local level. Refer to the resource indices at the back of this guide for the address of the professional organization(s) in your state. In addition, you can locate your state association for environmental education or a regional network of environmental educators by contacting the North American Association for Environmental Education, your Regional EPA Office or the Department of Education EE specialist in your state. Examples of the activities that state EE organizations are involved in include:

Ohio Conservation and Outdoor Education Association
397 West Myrtle Avenue
Newark, OH 43055

— Every spring members of the **Ohio Conservation and Outdoor Education Association** gather for a conference, sharing new ideas, renewing friendships and welcoming new teachers. Skill-building workshops, tables loaded with handouts, freebies and resources to buy, and field trips fill the weekend agenda. A newsletter keeps the members updated throughout the year and offers news from across the state.

Texas Environmental Education Advisory Committee
Attn: Irene Pickhardt
Texas Education Agency
1701 North Congress Ave.
Austin, TX 78701
(512) 463-9556

— In Texas, an **EE Advisory Committee** was created from business, industry, government representatives and teachers to help coordinate EE efforts throughout the state. They have spearheaded the dissemination of a helpful directory of outdoor education sites. One of the group's members, the Lower Colorado River Authority, is selling copies. The committee is also identifying and reviewing EE teacher training programs already being offered in different regions within the state. Those programs meeting state criteria will be certified as state EE sites, and the committee will raise funds to help teachers attend.

NAAEE
Membership and Publications:
PO Box 400
Troy, OH 45373
(513) 676-2514

Washington Address:
1255 23rd Street, NW, Suite 100
Washington DC 20037
(202) 467-8753

Several national organizations include:

— **The North American Association for Environmental Education** (NAAEE) is the largest organization of professional environmental educators in the world. The NAAEE offers conferences, a newsletter and other publications, providing the opportunity for educators to support and learn from each other.

Global Network of Environmental Education Centers
7010 Little River Turnpike
Suite 290
Annandale, VA 22003
(703) 750-6401
Fax (703) 750-6506

— **The Global Network of Environmental Education Centers** is a non-profit organization that facilitates information and resource exchange between EE centers to help them improve their educational efforts.

Alliance for Environmental Education, Inc.
51 Main St.
P.O. Box 368
The Plains, VA 22171
(703) 253-5812
Fax (703) 253-5811
EcoNet: 'alliance'

— **The Alliance for Environmental Education** is a coalition of nearly 300 professional, business, health, labor, government agency, education, environmental and other non-profit organizations that share a commitment to furthering EE efforts worldwide.

National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 2201-3000
(703) 243-7100

— **The National Science Teachers Association** is the largest organization of science teachers in the world. The NSTA offers a large environment/ecology section at each of its four yearly conferences, four journals, a student magazine, several newsletters, awards, competitions, projects, and publications for a wide range of subject and grade level interests.

There are also networks for specific issues or subject areas, such as:

GREEN
721 East Huron
Ann Arbor, MI 48104
(313) 761-8142

— **The Global Rivers Environmental Education Network** (GREEN). GREEN acts as a clearinghouse and network for individuals, school and community groups, and other organizations interested in water quality issues.

Networks for Students

You may be interested in having your students network with other students interested in environmental issues. The following is a very brief listing of some environmental groups by and for young people:

Clinton Hill's Kids for Saving Earth
620 Mendelssohn, Suite 133
Golden Valley, MN 55427
(800) 44E-ARTH

Clinton Hill's Kids for Saving Earth (KSE) is an independent, non-profit organization whose mission is to educate and empower children of all ages worldwide to unite with friends and take positive, peaceful action to help protect Earth's environment. KSE kids are involved in countless projects: recycling, adopting endangered animals, alerting others with letters, signs, plays, and petitions. The only requirement for membership is to recite the KSE promise, and pledge to try to help the Earth.

Kids For A Clean Environment
P.O. Box 158254
Nashville, TN 37215
(800) 952-3223

Kids For A Clean Environment is a non-profit childrens' organization that provides free membership to children and teachers. Included with the membership is a membership guide: *Our World, Our Future: A Kids Guide to Kids For A Clean Environment* and a subscription to the bimonthly newsletter *Kids F.A.C.E. Illustrated*. Materials focus on environmental topics and offer projects that can be performed at home or at school.

Student Environmental Action Coalition
P.O. Box 1168
Chapel Hill, NC 27514-1168
(919) 967-4600
Toll Free: (800) 700-SEAC

The Student Environmental Action Coalition (SEAC) is a grassroots coalition of over 2,000 high school and college student and youth environmental groups, working to protect the planet. Among other things, SEAC runs a National Clearinghouse of information on environmental and social justice issues and publishes a monthly magazine which presents a comprehensive picture of the student environmental movement.

Grantwriting — Where to Look

Grantwriting can be an intimidating and time-consuming process. But it can also lead to solid financial support for your EE efforts. When Aline Novak (*"One Fish, Two Fish, Red Fish, School Fish"*) wanted to increase the scale of an experiment her students were conducting on the effects of an herbicide on trout, she looked to outside funding sources. With grants from the Chesapeake Bay Trust and the Maryland Department of Natural Resources' Tidewater Administration she was able to buy an old bulk tank, new water pumps and water-quality testing equipment. Debra Mullinnex (*"The Sky's the Limit"*) wrote a thousand dollar grant to buy seeds, garden tools and a strong fence for her garden project. This section includes information on several funding sources and tips for writing convincing proposals.

Non-Profit Foundations

According to a 1990 report by the Environmental Data Research Group, charitable, non-profit foundations gave well over $30 million to support EE initiatives. These foundations range from national, multi-faceted organizations to foundations whose activities are restricted both topically and geographically. The most direct way to investigate foundations is to call and request the foundation's yearly report or an explanation of their current funding priorities.

Regional or local community foundations are the best place to begin your search. Regional or local foundations fund a variety of projects aimed at improving the quality of life in a particular area, which in many cases includes environmental education. The **El Paso Community Foundation, the Denver Foundation** and the **Northwest Area Foundation** are examples of organizations that provide funding for projects in specified metropolitan areas. The **New Hampshire Charitable Foundation** is an example of a foundation that provides funding for projects in a specific state. In seeking information about similar groups in your area, one place to turn is your Chamber of Commerce. Library research may also identify local foundations.

The Denver Foundation
455 Sherman Street
Suite 220
Denver, CO 80203
(303) 778-7587

Northwest Area Foundation
Suite E-1201
First National Bank
332 Minnesota Street
St. Paul, MN 55101-1373
(612) 224-9635

The New Hampshire Charitable Foundation
37 Pleasant Street
P.O. Box 1335
Concord, NH 03302
(603) 225-6641

Large, national philanthropic foundations are also aware of the growing need for EE. The competition for grants from national foundations, however, is extremely keen. In seeking information about national foundations, one place to turn is the **Environmental Grantmakers Association.** This association, made up of some of the largest foundations in the country, can provide general information on grants available for EE initiatives. The **Environmental Data Research Institute's** *Environmental Grantmaking Foundations 1993* publication lists geographic data, application deadlines, emphasis and limitations of funding, and names of personnel for 417 foundations.

Environmental Grantmakers Association
1290 Avenue of the Americas
Suite 3450
New York, NY 10104
(212) 373-4260
Fax (212) 315-0996

Environmental Data Research Institute
1655 Elmwood Avenue, Suite 225
Rochester, NY 14620
(716) 473-3090
Toll Free: (800) 724-1857
Fax (716) 473-0968

Library research may also help identify national foundations. One useful resource at the library is the *Chronicle of Philanthropy: The Newspaper of the Non-profit World.* It provides important information about the funding priorities of many non-profit foundations.

Below are a few examples illustrating the variety of foundations that exist nationally.

— **The National Environmental Education and Training Foundation** is a Congressionally chartered non-profit charitable foundation dedicated to fostering public-private partnerships in support of environmental education and training programs nationwide. The Foundation is able to combine public sector resources with private sector funds in support of EE. In October 1992, the Foundation awarded more than $1 million in grants for EE projects.

NEETF
915 Fifteenth Street, N.W.
Suite 200
Washington, DC 20005
(202) 628-8200
Fax (202) 628-8204

National Fish and Wildlife Foundation
1120 Connecticut Avenue, N.W.
Suite 900
Washington, D.C. 20036
(202) 857-0166

The John D. and Catherine T. MacArther Foundation
140 South Dearborn Street,
Suite 1100
Chicago, IL 60603
(312) 726-8000

PEW Charitable Trusts
One Commerce Square
2005 Market Street, Suite 1700
Philadelphia, PA 19103-7017
(215) 575-9050

The George Gund Foundation
1845 Guildhall Building
45 Prospect Avenue West
Cleveland, OH 44115
(216) 241-3114

— **The National Fish and Wildlife Foundation,** like the National Environmental Education and Training Foundation, is a Congressionally chartered, non-profit charitable foundation that focuses a substantial amount of its annual grants on programs supporting environmental education in wildlife and natural resources issues.

— **The John D. and Catherine T. MacArthur Foundation,** a large, national charitable foundation, was identified by Environmental Data Research Group as the largest funding source of EE projects in 1990. They were estimated to have given out more than $5.5 million to EE projects.

— **The PEW Charitable Trusts** is another large, national charitable foundation with interests in environmental education. In 1990, PEW funded 22 environmental education projects, totaling more than $1 million.

— **The George Gund Foundation** funds national projects, but like most foundations, it has a focus on a particular geographic area. In Gund's case, that focus is Cleveland, Ohio. In 1991, they provided over $920,000 for EE projects.

The Corporate Sector

National and multinational corporations can be a valuable source of support. Large corporations are often willing to support innovative EE programs. Corporate support is not limited to national projects. Sharon Ferriss' students *("Too Much Stuff")* approached the local Wal-Mart and received financial assistance to start a school recycling program. Charlotte Pine *("We Never Give Up")* convinced the local Target store to sponsor her students' efforts to start a school carpooling program.

Large corporations often have foundations that oversee their charitable activities. The local branch of these organizations is the best place to receive information concerning their specific proposal requirements. It is not uncommon, for example, for local branches of banks to administer community grant programs. This is especially true for locally-owned banks.

While approaching these large corporations might seem a little intimidating, you should not underestimate either their desire to become involved in projects that show their concern for the local community, or the depth of their pockets. A detailed proposal is necessary to inform potential supporters of both the goals you hope to accomplish and the program's time frame.

As Bonnie Trusler's students (*"The Energy Patrol Strikes!"*) have discovered, financial support is not the only assistance businesses can deliver. Local utility companies and universities are often willing to take an active role in lending their expertise. Engineers, lawyers and architects are just a few of the professions teachers can approach to get professional support for EE projects.

State Level

Approaches toward financing environmental education at the state level are diverse. In states such as Wisconsin, for example, programs are financed by allocations from the state treasury. The **Wisconsin Environmental Education Grants Program** funds EE curriculum development and staff training in environmental education in Wisconsin. In California, a portion of the revenue from the sale of specialized license plates goes into an account dedicated to funding environmental education projects. The **California Department of Education** has established a grants program to encourage implementation of EE projects at both the school- and district-level. The Iowa Department of Education administers the **Iowa Conservation Education Program** which funds the development and dissemination of EE curriculum materials and in-service teacher training.

Given the tight budgetary constraints, other states have developed creative financing approaches for environmental education. In Florida, for example, the **Environmental Education Foundation of Florida, Inc.** has been established to secure funding for EE programs in the state school system.

Your state's environmental education coordinator can provide information about the availability of similar funding possibilities in your state. See the resource indices at the back of this guide for the name and address of your state coordinator.

Wisconsin Environmental Education Grants Program
P.O. Box 7841
Madison, WI 53707-7841
(608) 266-3155

California Department of Education
721 Capitol Mall
P.O. Box 944272
Sacramento, CA 94244-2720
(916) 657-5374

Iowa Conservation Education Program
Iowa Department of Education
Resource Enhancement and Protection-
Conservation Education Program Board
Dwayne Toomson
Grimes State Building Office
Des Moines, IA 50319
(515) 281-3146

Environmental Education Foundation of Florida, Inc.
The Capitol, Suite LL06
Tallahassee, FL 32399-0001
(904) 488-5551

Federal Level

Under section 6 of the National Environmental Education Act (public law 101- 619) the Environmental Protection Agency is authorized to provide grants up to $250,000 to support projects to "design, demonstrate, or disseminate practices, methods, or techniques related to environmental education and training."

For information on how to apply for grants over $25,000:
Environmental Protection Agency (1707)
Environmental Education Division (grants)
401 M Street SW
Washington, DC 20460
(202) 260-3335

For information on how to apply for grants under or equal to $25,000:
Contact your Regional EPA Environmental Education Coordinator (See the resource indices at the end of this guide for a list of addresses)

In 1992, under the Section 6 grants program, the EPA awarded $2.4 million from requests for more than $100 million. In 1993, the EPA awarded 261 grants worth $2.7 million. Of the selected grants, many went to programs at individual schools or school districts. These include a $5,000 grant to Petrolia School, Inc. (see Seth Zuckerman, *"Action for the Forest"*) to develop a curriculum to link science and social studies with an emphasis on environmental issues both local and global; a $5,000 grant to the Casa Grande Elementary School District in Casa Grande, Arizona, to develop an outdoor environmental education center, featuring hands-on activities, for ninety at-risk students; and a $4,650 grant to the Linn R-11 School in Linn, Missouri, to disseminate information concerning environmental problems using a student-operated public service FM radio station.

Department of Agriculture
Natural Resources and Environment
Environmental Coordination
Auditors Building
Fifth Floor SO
201 14th Street, SW
Washington, DC 20090-6090
(202) 720-7173

The U.S. Department of Agriculture *Natural Resource Education Program* provides grants to local schools, non-profit organizations, and others to work with state forestry agencies and national forests to teach about the environment.

How to Write an Effective Grant Proposal

There are several resources that may be helpful when writing your grant application. You may know a fellow teacher who has experience writing grant applications or your school may have an administrator assigned to this role. You may even know someone in your community with skills in this area: a friend, parent, or P.S.T.A. member.

There are also resources available outside of your immediate community. For example, the North American Association for Environmental Education, NAAEE, in cooperation with the U.S. Environmental Protection Agency has produced a 30-page document with tips, advice and resources to help you better target your fund raising efforts and write better proposals. *Grant Funding for Your Environmental Education Program: Strategies and Options* is available from NAAEE. Write to their Publications and Member Services Office for more information.

NAAEE
Publications and Membership
P.O. Box 400
Troy, OH 45373
(513) 676-2514

Although grant applications vary, at minimum, you will be asked for the following information:

— **Statement of how your project will meet the objectives of the grant program:** Explain how your project addresses the program's overall objectives.

— **Problem statement:** Explain the need your project addresses. Include an anecdote or story to support your problem statement and list any support your proposal has already gained, such as community or parental support.

— **Goals statement:** Describe the goals of your project. Tell how your initiative addresses the problem outlined in your problem statement.

— **Action plan:** Explain how you plan to achieve your goals. Include a timeline and a budget.

— **Evaluation method:** Describe how you will measure the success of your project.

When developing your proposal, it is important to remember who your audience is, what you need to convince them of, and why you need their support. In addition, it is extremely important to follow the directions included in the grant application. Faced with the daunting task of sorting through hundreds of applications, the first criteria reviewers often check for is whether the applicant followed the directions.

It is important to follow-up your application with a letter, phone call or personal visit. This conveys your commitment to the project. It may even be possible, particularly with local funding sources, to invite a representative of the organization to visit your school and observe your program.

If you receive funding, it is a good idea to send thank-you letters to all grantors. In addition, you will want to thank anyone who helped you win the grant. You may also be requested to write a follow-up report.

If you are not awarded a grant, you might want to ask grantors to explain their specific reasons for not funding your project. This is a good way to improve your grant application in the future.

A Pat On the Back: EE Awards, Scholarships and Stipends

When Charlotte Pine *("We Never Give Up")* first entertained the idea of giving her fifth-grade students the task of 'solving' the problem of air pollution in their county, never in her wildest dreams did she envision her students featured in a CBS special or participating in World Environment Day at the United Nations.

Many organizations and businessess–both nationally and locally–recognize the contribution of teachers and students to their communities. Some award certificates of appreciation, others provide scholarships, and others give cash prizes or stipends. Below are some award programs that pertain to EE efforts.

— Young people from all 50 states are invited annually to participate in the **President's Environmental Youth Awards.** The program is aimed at encouraging individuals, school classes, summer camps, public interest groups and youth organizations to promote environmental awareness and positive community involvement. The

program has two components: The regional certificate program and the national awards competition. Application materials for the PEYA award are available from your EPA Regional Office. See the resource indices in this guide for that address. The EPA Environmental Education Division also administers the **National Environmental Education Awards** program. This award, given every two years, next in the Spring of 1995, honors individuals for their outstanding contributions to environmental education. Application materials may be requested from the U.S. EPA's Environmental Education Division in Washington, D.C.

—**The Amway Corporation's "Class Act" Environmental Challenge** for students grades 4-8 awards $5,000 cash prizes to each of ten schools nationwide. The awards honor outstanding enviornmental stewardship projects, campaigns or fundraisers. By encouraging and showcasing the environmental projects of students and their schools, Amway hopes to raise awareness among youth and give them an opportunuty to show that they can make a difference through individual and team efforts.

—**The Renew America** *Environmental Success Index* identifies programs around the nation, whether large or small, that effectively protect, restore or enhance the environment. Each year's winning programs receive the Robert Rodale Environmental Achievement Award. Renew America is a non-profit, clearinghouse for environmental solutions.

—**Chevron Corporation** awards **25 Chevron Conservation Awards** every year; 10 go to professionals, 10 to volunteers, and 5 to organizations or government agencies. Anyone—students or teachers—involved in natural resource conservation may apply for a $1000 award.

—**Seiko Youth Challenge** is a nationwide competition in which teams of two to four students in grades 9-12, guided by a faculty advisor, are asked to identify, investigate, analyze and propose a solution to a specific environmental problem facing their owncommunity.

—**The Presidential Awards for Excellence in Science and Mathematics Teaching (PAESMT)**, identify outstanding teachers of science and mathematics K-12. Guidelines for nomination include ability to engage students in hands-on science and/or mathematics inquiry activities, and ability to generate excitement among students, colleagues, and parents about the uses of science and mathematics in everyday life.

—**The Eco-Educator Award** is given by the **"Firestone Firehawks"** to recognize teachers who demonstrate creative use of innovative, exploratory and hands-on methods to teach children about complex interrelationships between humans and their environment. The school, agency or community organization with which each winner is associated will be awarded a $1,000 stipend to be applied to EE programs.

U.S. Environmental Protection Agency
Environmental Education Division (1707)
401 M Street, SW
Washington, DC 20460
(202) 260-4962
or (202) 260-4965 "Class Act"

"Class Act"
Amway Creative Resources, Inc.
Grand Plaza Place
220 Lyon Street NW, Suite 567
Grand Rapids, MI 49503-2210
(616) 456-1500

Renew America
1400 Sixteenth Street, NW, Suite 710
Washington, DC 20036
(202) 232-2252

Chevron Conservation Awards Program
P.O. Box 7753
San Francisco, CA 94120-7753
(415) 894-2457

Seiko Youth Challenge
c/o DRB Communications
1234 Summer Street
Stamford, CT 06905
(800) 323-1550

Elementary PAESMT
National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 22201
(703) 243-7100

Secondary PAESMT
National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 22201
(703) 243-7100

Firestone Firehawks
Eco-Educator Award
209 7th Ave. N.
Nashville, TN 37219
(615) 780-3330

TAPESTRY/NSTA
1840 Wilson Boulevard
Arlington, VA 22201
(703) 243-7100

Council for Basic Education
1319 F Street, N.W.
Suite 900
Washington, DC 20004-1152
(202) 347-4171

A Pledge and a Promise Environmental Awards
Education Department
Sea World
7007 Sea World Drive
Orlando, FL 32821
(407) 363-2389

— **Toyota/National Science Teachers Association TAPESTRY Grants.** TAPESTRY is a teacher grant program that offers grants of up to $10,000 each to science teachers in grades 6-12 who propose innovative student projects in environmental and physical science.

— **The Council for Basic Education** offers fellowships of up to $3800 for independent summer study in the humanities on a topic of choice which links the sciences and the humanities. The award is open to science and math teachers who have demonstrated the potential for successful independent study and who present outstanding study plans.

— **The Anheuser-Busch Theme Parks "A Pledge and a Promise Environmental Awards 1994"** recognize outstanding efforts of school groups who have made lasting contributions to the environment. A total of thirteen awards are presented, including a grand award and a first, second and third place award in each of the following four categories: K-5, 6-8, 9-12, and college.

Final Thoughts

When Kendra Grove *("Handling Hurdles")* began supplementing her 10th-grade biology class with field trips, she could never have imagined she would eventually get her county bus driver's license to save her school money. She never dreamed that she would eventually form a 4-H club to get the extra insurance her trips required.

Gil and Marilyn Alexander *("The Big Stink")* could not have anticipated that their field trip with four students 10 years ago would grow into a program of 90 students per year and lead to the creation of a non-profit organization to take donations and write grant proposals.

Jerri Kelly *("Mangrove Monitor Madness")* never imagined that bringing an aquarium, a hamster and a bird into her language arts class would eventually lead to the creation of a butterfly garden, a green house and an all-school animal laboratory housing over 60 animals.

These examples illustrate the excitement that environmental education can generate among students, teachers, parents and school administrators. They also illustrate creative ways teachers have overcome obstacles in bringing environmental education into their classrooms.

Whether the EE activity, lesson, project, unit or curriculum you initiate grows like those of Gil, Marilyn and Jerri's, or leads to implementation challenges like those Kendra faced, you will discover that environmental education is exciting and full of challenges. Regardless of where environmental education in the classroom leads you and your students, you will find that your most exciting stories are those from when you were just "getting started."

We Never Give Up

Level
- Upper Elementary

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources
- Locating Funding: Fundraising
- Networking With Other Educators

When a mock television program, Earth Talk, reported that their county was not meeting federal clean air standards and that 70 percent of air pollution is due to car emissions, Charlotte Pine knew she was experiencing 'a teachable moment.'

"However, I never imagined the outcome of my question when I innocently asked the class, 'What can we do about this?'" she says.

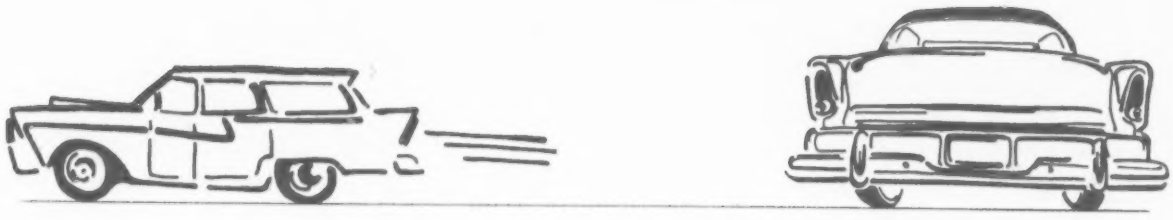
Students decided to focus on automobile pollution in a unit and Eco-Carpool '91, a schoolwide car pool program, was born. Fourth- and fifth-graders set to work designing a master plan and creating the forms necessary to set up car pools at the school. "I was amazed at how thorough the students were in their design of the forms," recalls Charlotte, who had never before been actively involved in environmental education. "They would think aloud: 'We have to be careful to consider the number of safe seats in each car, as well as the rider's location and schedule of availability.' They really dug their heels in and considered the problem from all angles."

The project fit Charlotte's theme for the year: "Let's Get Down to Earth: Earth Day Every Day." Students planned an aggressive advertising campaign consisting of three schoolwide contests: A Car Pool Slogan Contest, a Bumper Sticker Contest and a Poster Design Contest. Target stores, the group's key sponsor, presented ecology-oriented gifts to the contest winners and funded five hundred "Pollution Solution: Car Pool" bumper stickers. The school's P.T.O. contributed nine award ribbons. In addition, a special closed-circuit television feature, Eco-Babble, reported car-pool progress and the awarding of class car-pool participation certificates. To generate further interest in the environment among parents and teachers, junior representatives wrote articles for the school's monthly Nob Hill Newsletter.

Eco-Carpool '91 enrolled 79 participants from the school community, resulting in reduced air-pollution levels for the county and reduced traffic congestion at the school.

Charlotte Pine
Nob Hill Elementary
2100 Northwest 104 Avenue
Sunrise, Florida 33322

Recognizing a strong national interest in this project, the next year Charlotte and her students decided to develop a model car-pool program that could be easily replicated across the country. The first step was to evaluate the original project. Forms were carefully examined and revised. New ones were added. An Eco-Car Pool packet was written to make it easier to start up this program in other schools. The availability of this packet was publicized in "Renew America's Success Index," in "What Works: Air Pollution Solutions," compiled by the Environmental Exchange and in a teacher's manual, "Plan It For the Planet," currently distributed by Scholastic News, Inc., to 100,000 classrooms around the nation.



Awards rolled in. NBC's "Today Show" interviewed one student, while Children's Earth Fund selected another to help present a Children's State of the Union Address at the Washington Press Club. Three other students traveled with Charlotte to New York City to participate in World Environment Day at the United Nations. They were recognized as "Champion Defenders of the Earth" in a contest sponsored by environmental programs, Target and Kids for Saving Earth. A CBS special, "50 Simple Things Kids Can Do to Save the Earth," featured other students.

Charlotte Pine had never been actively involved in environmental education prior to serving as "guide on the side" to Eco-Carpool '91. However, the goals of environmental education fit neatly into her philosophy of teaching. "It's my responsibility to help them to identify and solve problems via the process of creative problem solving. That's what Eco-Carpool '91 was really all about. It was our solution to the problem of air pollution."

Clearly, the Florida Kids For Clean Air achieved their goal. In addition to gaining the attention of classrooms across the country, there are now 141 carpoolers at Nob Hill. This is a 36 percent increase over last year and a 78 percent increase from the first year of the program.

Charlotte attributes the group's success to the students' hard work. "Their motto is 'We Never Give Up,' and it shows," Charlotte says. "The kids learned that they can make a difference. I truly believe that helping them to achieve this sense of self-efficacy is an important part of their training to become leaders in the 21st century." ■

Eco-Carpool

Caring and sharing have always been our creed, to spread the eco-gospel is what we believe. Our goal to save the planet has been very strong, as Florida Kids for Clean Air, we've worked hard and long.

Using a variety of approaches has been our claim to fame, having more success than failure, we're ahead of the game. We stick with our projects through thick and through thin, with strong commitment and enthusiasm we usually win.

To clean up the air, we're "all systems go," as our school-wide car pool program continues to grow. Special thanks to EPA for being our motivating force, by identifying Florida's air pollution problem, you set us on course.

We'll be keeping our wheels spinning, always in the right direction, helping to move our planet toward environmental perfection.

The Big Stink

Level
- High School

Story Focus
- Enlisting Community Support
- Locating Instructional Resources

Take a group of high school freshman to a remote canyon reservoir for a week, ask them to work long hours in the hot sun with water-monitoring equipment, and you have trouble getting them to quit working long enough to sleep. Gil and Marilyn Alexander should know. They've been taking groups to Canyon Ferry Reservoir for years. The project began when students noticed the water "smelled rotten" after a long hot summer when algae were abundant.

"We figured anything that stunk so bad was worth studying," said Gil, an earth science teacher at Helena High School. He and Marilyn, a chemistry teacher, struck upon the idea of an extended field trip with some students, and decided to fund it almost entirely out of their own pockets.

The first crew of students, four of them, camped on the riverbank of the major feeder streams to the Missouri River. Under Gil and Marilyn's guidance, they studied the geology and chemistry of the canyon and sampled the river system that feeds the reservoir. A week later, an algae bloom coincidentally became toxic and killed a number of cattle in the area. The project was highlighted on news stories about the incident, and the kids basked in the sudden attention.

Gil and Marilyn Alexander
Canyon Ferry Limnological Institute
7653 Canyon Ferry Road
Helena, Montana 59601

Over the course of a decade, the field trip has evolved into a residential field study which has grown from four students to 90. As th project's size has expanded, so have the responsibilities. No longer funded by Gil and Marilyn's checkbook, a 501(c)(3) non-profit corporation now takes donations to cover expenses. Grants support expanded projects, and the community has enthusiastically helped. The program provides water monitoring clinics for groups like Montana Clean Lakes Volunteer Monitors, Project WILD, and Project WET, and has established a computer workshop and information network, which allows other groups to tap into their information. The breadth of programs stretch from awareness clinics to full blown scientific investigations using a wide array of sophisticated instrumentation for data acquisition. They even look forward to an exchange program next year with Russian students, who will study Montana rivers while American students explore rivers flowing to the White Sea.

The exciting and challenging atmosphere brings new students into close contact with science, an experience that has had a lifelong impact for many. About 80 percent of the participating students have continued in science. One former student explains that after a long trail of changed majors in college, she's pleasantly surprised to find that she's doing what she loved as a ninth-grader: She's a water quality consultant in Colorado. ■

Handling Hurdles

Level
- High School

Story Focus
- Enlisting Administrative Support
- Locating Instructional Resources
- Locating Funding: Fundraising

By the time Rachel reached Kendra Grove's door, the sign-up sheet for the river clean-up had 50 names on it. With that many names, at least two busloads of students from Kendra's 11th-and 12th-grade marine biology classes would be going to clean up a river in Pensacola, Florida. Last month Rachel went with a busload of students to visit the local landfill.

Kendra's students have taken numerous trips: to the Environmental Protection Agency in Pensacola; to the Florida Keys to study mangroves, seagrass beds and coral reefs; and to the Crystal River to study manatees.

Kendra teaches marine biology at Escambia High School, a curriculum that includes aspects of aquatic ecology, such as material on water quality, legal issues of water, and water use in the home. About once a month, Kendra offers a trip away from school. She believes it's important to get kids out in the field to get hands-on experience with what they're studying.

"The trips add a lot to the curriculum," Kendra says. "Connections are made when we talk about water used in the home and then go to the sewage treatment plant. It's often the first time students fully realize where their water goes. Following this unit is a unit on estuaries. Students first study estuaries in the classroom and then take a trip to see them. Again, students learn that it's all one big system." Kendra also organizes several cleanups each year, one along the river and the other to clean up one of the Barrier Islands' beaches.

Although the trips expand and reinforce concepts learned in class, it takes perseverance to get them organized. "At first it was discouraging to get these trips going," Kendra remarks. "The administration was hesitant. They were concerned that a trip to the beach would simply be a day of sunbathing. I had to convince them that we were, in fact, going to be wading and digging in black, stinky muck, looking for worms and other aquatic organisms."

Kendra Grove
Escambia High School
Pensacola, Florida 32504

There were also other hurdles, such as arranging transportation and the lack of adequate insurance. "I found you have to be creative on how to take these trips," says Kendra. "When I first started, I went as far as to get my county bus driver's license, so that I could be the one to drive the bus and not run up extra costs for the school. You really have to make it happen, and gradually, after a trip here and there, the administration no longer questions you."

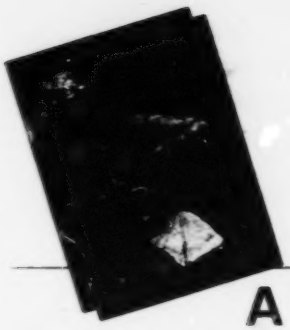
On the more extensive trips, Kendra discovered they needed to have better insurance coverage. Consequently, she started a 4-H club, which offers better coverage. Now, any student who comes along on these bigger trips also becomes a 4-H member.

Despite all this preparation, Kendra emphasizes that the trips are worth the trouble. "The students get so much out of them, and it gives them something to do and look forward to instead of hanging out at the local convenience store after school.

"Rachel was one of the typical convenience store groupies, but when she heard about my Florida Keys trip last year, she started working odd jobs after school and saving her money," says Kendra. "The trip costs $400 and her parents cannot afford that much money. They are, however, supportive of her endeavors and happy that her after-school activities have become more productive."

"The administration was hesitant. They were concerned that a trip to the beach would simply be a day of sunbathing. I had to convince them that we were, in fact, going to be wading and digging in black, stinky muck, looking for worms and other aquatic organisms."

Kendra likes her students to turn a trip into something they can take back and share with the rest of the school. Recently, a number of students have been working on a play they will put on for an elementary school class. "It's amazing," exclaims Kendra, "they've been there everyday after school for two weeks, writing and working on this play. I don't have to do anything, but provide the space. They're doing it all on their own." ■



A Rainforest Takes Over School

Level
- Middle School

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources
- Building Skills: Workshops, Courses, Inservice
- Networking With Other Educators

The rainforest Rosalie Cochran and her seventh-graders build in their classroom grows like long vines that travel down the hall each year and capture the entire school's imagination. It started when Rosalie, after 17 years of teaching, began creating her own environmental education curriculum.

Rosalie's curriculum covers climate change, ozone depletion, prairie restoration, groundwater, solid waste and world food supplies. But the first topic has a reputation among students as the highlight: six weeks spent studying tropical rainforests.

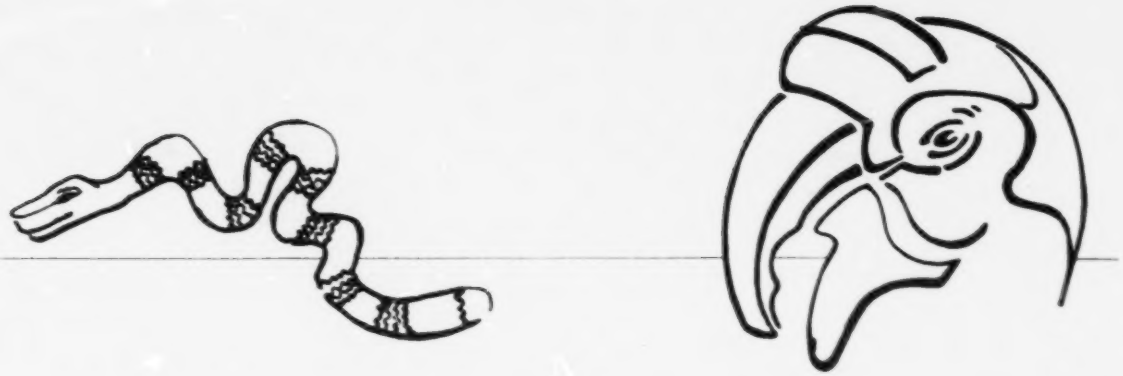
During that time, students turn the classroom into a rainforest. Humid and lush, it chimes with parrot and peccary calls. Vines, trees and epiphytes of the tropical jungle hang above humidifiers while tape recorders play rainforest sounds.

It doesn't stop there, though. In shop class, students build bases for trees. In English classes, students write, revise and send letters to figures such as the President of Brazil. In math labs, teachers help students compile data and statistics on rainforest depletion. Social studies students explore the culture and politics of tropical countries. To develop life skills, the students investigate a conservation organization that protects plots of rainforest. After determining it was a sound organization, the class earned enough money to buy twenty acres.

Rosalie Cochran / Diane Whitney
Fairfield Middle School
404 West Fillmore
Fairfield, Iowa 52556

Emphasis in Rosalie's classroom is placed on fairness and participation. Students express their thoughts freely, and learn that their opinion counts. The study methods she uses are based on recommendations from the University of Northern Iowa's Environmental Issues Instruction program. In the e.i.i., students work through a four-step process. The first two involve identifying the players involved, their positions and values, and the ecological foundations surrounding the problem. Then students do an in-depth investigation that includes library research and soliciting opinions of local citizens. Finally, after looking at many sides of the issue, they determine what should be done to help solve the problem.

The rainforest project now involves almost every teacher in the building. It has sparked great creativity, inspiring many teachers to incorporate more environmental themes into their classes. Diane Whitney, who teaches home economics lab, has since attended e.i.i. workshops

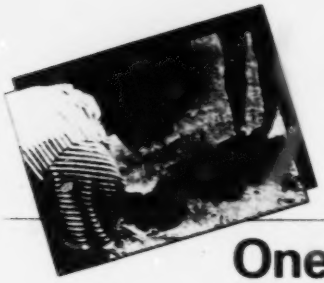


and devised weeklong sections on tropical rainforests and global climate change. Her students perform energy audits on appliances in their homes and inventory food and furniture with origins in the tropics. Diane's curriculum requirements include units on housing, money management and food and nutrition. At first she thought environmental topics would be difficult to adapt to her curriculum. Yet, Diane says, the new additions fit right in and greatly benefited her course. "It's great to be able to share information with other teachers in the school," Diane adds.

"The rainforest project now **involves** almost **every teacher** in the building. It has **sparked great creativity, inspiring** many teachers to incorporate more environmental themes into their classes."

The first time Rosalie tried her curriculum, she invited the principal to sit and watch an e.i.i. workshop. He gave her the go ahead to develop a year-long trial program. The trial surpassed everyone's expectations. With administrative support, the new course work earned parent and community praise, newspaper attention, and school board support.

Positive responses continue to come in. Former students return, telling of continued involvement in the same issues she raised with them. The Brazilian president has responded to student letters. And, in perhaps the most stirring recommendation of all, Rosalie Cochran says that she's had more fun in the five years she's done environmental education than during the rest of her long teaching career! ■



One Fish, Two Fish, Red Fish, School Fish

Level
- High School

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Funding: Grantwriting

There's something fishy about Aline Novak's teaching approach.

Three years ago, she hauled 55-gallon drums for goldfish into her classroom at Clear Spring High School in western Maryland. Now, she has added a several hundred gallon milk tank full of trout. Her biology classroom is buzzing with research projects as students study local agricultural practices and their impact on the aquatic environment.

The 440-student school is nestled in quiet countryside. The local economy is so rooted in agriculture the school has a department for agriculture, just as it does for English and science. In 1990, Aline wanted to combine science and agriculture in a hands-on project.

"I've always been excited by water issues," she says. "It seemed logical to combine my knowledge with the most important community issue."

What developed was a soil-less system of producing vegetables using water from 55-gallon drums filled with goldfish. The nutrient-enriched water was pumped to the plants. And students could watch plant growth happen right under their noses.

The following year, students designed a more complicated experiment. Using the same 55-gallon drums, they stocked the tanks with trout and added small amounts of Atrazine, a herbicide popular in their area. This time, they were looking for a correlation between use of Atrazine and its presence in the fatty tissue of the fish. The results supported research done at the Maryland Department of Natural Resources' Tidewater Administration. Atrazine showed up in the fish.

Aline Novak
Clear Spring High School
12630 Broadford
Clear Spring, Maryland 21711

The program has continued to grow. This year, grants from the Chesapeake Bay and the Tidewater Administration allowed Aline to purchase an old bulk milk tank, new water pumps and a water-quality testing kit. The several-hundred-gallon tank will provide a more natural habitat for the trout. Aline's goal is to sustain the fish for a longer period, so that the students can compare the quality of local lake water with the quality of water in the trout tank. "It will be interesting to see if our lake water quality is good enough to support trout, which are very dependent on good water," she says.

Aline Novak's passion for biology and environmental science came from her own experience in high school biology. For 17 years, she's been passing that same passion on to her students. But the effort hasn't been easy, Aline concedes: "You have a great idea, but the money is always hard to find." While her school administration has been supportive, it has been up to her to secure funding. It has taken ingenuity, determination and persistence to make her dream of providing fun, exciting and memorable environmental education a reality. ■

The Sky's the Limit

Level
- Middle School

Story Focus
- Enlisting Community Support
- Networking With Other Educators
- Locating Funding: Grantwriting

As Debra Mullinnix moves through the rows of emerging potato plants, she pulls out a weed here and there. "Although these roots give support to the soil, they steal valuable nutrients away from the potatoes. Since we're not talking of a soil that is particularly vulnerable to water and wind erosion, clean weeding is ecologically safe, and the stems of these weeds can be composted and used later to replenish the soil. This is the kind of agricultural and ecological complexity which is very valuable for children to see and feel firsthand. They don't understand it when they read it in textbooks, but when they are out here digging with their hands, it instills some degree of responsibility into their heads."

Mullinnix, a seventh-grade honors life science teacher at Wunderlich Intermediate School in the Klein Intermediate School District in Houston, Texas, developed the idea for a working, student-run garden. She is currently writing a proposal for a thousand-dollar grant, which would allow her to increase the area under cultivation. "The thousand dollars would let us plant a garden 70 feet by 25 feet, and buy seeds, garden tools, and a strong fence to keep out small animals."

Debra Mullinnix
Wunderlich Intermediate School
9406 Dornoch
Spring, Texas 77379

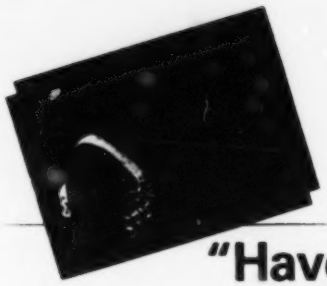
Mullinnix stops and sits in the dirt between rows, fingering one of the small shoots uncurling from the soil. "Young kids look at these and see some magical element of growth showing itself. By giving them hands-on knowledge about how seeds germinate, stages of growth, soil nutrition, decomposition, and so on, you might take away a bit of the mystery, but you give them an everlasting appreciation of the complexity and the interdependence of the Earth's ecosystems. They might not retain any of the detailed information later in life, but they will retain a perception that they are personally affected by the natural world, and will therefore take action where it is needed. Besides, many people's career interests begin in middle school. If I can possibly spark a life-long interest for even one seventh-grader, this is an important feat."

The gardening project is maintained solely through the efforts of students, and most of these efforts are self-initiated and then carried out with guidance from Mullinnix. "All of the work is done in small groups," she says. "They decide upon an aspect of the garden to investigate and research their subject through various means, including community surveys, library research and the questioning of specialists. From this research, students decide which type of seeds to grow, which type of fertilizer to use and other important choices. They come up with a hypothesis (for example, that chemical fertilizer and composted fertilizer will affect plants differently), and test this hypothesis out in the garden, analyzing the data and presenting their findings to the class as a whole."

This project allows the opportunity for community interaction, bringing in local experts from nurseries or pesticide companies to speak with the students. "It's really a great way to bring some of the different schools of thought together. And it doesn't take a major time commitment. The garden takes about three days to set up. All the work is done during my class time." Once the garden is set up, there is a need only for periodic time allotments to make observations or do the necessary weeding. Mullinnix also hopes to begin a joint garden project, with each of her students working with a student from the special education class.

"The possibilities are endless. It is a fairly easily managed project with enormous benefits. The students were a little hesitant at first being torn away from textbook education, but now many of them go home excited and talking about the garden. And it's the kind of thing which is passed along from teacher to teacher. Already, I have heard interest from the special education teacher and the sixth-grade teacher about starting similar projects. The main effort is in setting up. After that, the sky's the limit."■

"Young kids look at these and see some magical element of growth showing itself. By giving them **hands-on knowledge** about how seeds germinate, stages of growth, soil nutrition, decomposition, and so on, you might **take away a bit of the mystery,** but you give them an **everlasting appreciation** of the complexity and the interdependence of the Earth's ecosystems."



"Have You Seen My Slender Salamander?"

Level
- High School

Story Focus
- Enlisting Community Support
- Locating Funding: Fundraising
- Locating Funding: Grantwriting

A trail of giggles followed the student as he left the crowded school library and strode down the hall. As he approached, the cause of amusement became clear: The button pinned to his T-shirt asked, "Have you seen my slender salamander?"

Gary Smith, a biology teacher at Katella High School in Anaheim, California, explains: "California has over 200 endangered species, and we wrote the name of every species on butcher paper. The roll ended up being 20 feet long, and we had to drape it over the second story balcony of the school. As if that wasn't noticeable enough, my students wanted to raise awareness even further about endangered species—and make a little money for our projects—by selling buttons. We came up with a couple different slogans for the buttons, like "Have you seen my . . . " or "Would you like to hold my . . ." with the names of the species inserted. All the buttons were gone in ten minutes. The salamander buttons were the first to sell out."

Students of color make up a majority of the population of Katella High School. In order to get his students to "buy into" the environment, Gary believes it is important to show respect for their particular cultures and environment. Teachers have to "tie the human environment to the natural environment through environmental education activities that involve collaboration, negotiation, agreement, and problem-solving," he says. Gary's students learn that homelessness and poverty are as much environmental issues as the endangered species they wrote on the butcher paper.

"Every year, each of my classes sponsors one or two children overseas, usually through an organization called World Vision," Gary says. "That's just one of the environmental projects for which my students need to raise money. In addition to the endangered species buttons, one year we sold some very popular T-shirts to raise money for the Anaheim Relief project. Another year, we sold baked goods each Friday. We made about $80 per week selling the goodies to the other students."

Gary Smith
Katella High School
2204 Lisbeth Ave
Anaheim, California 92806

Not only do students work to raise money, but they also decide what to do with it. The school regularly donates to a homeless shelter, and sponsored "Trick or Can" on Halloween to collect canned goods. Over the years, students have purchased rainforest property, planted ecologically adapted, native plants on the school's open campus, and bought books on environmental topics for the school library.

"This year we bought a number of copies of the World Watch Institute's *State of the World* publication," Gary says. "We sent copies to the principal, the mayor, the city council and the superintendent of schools. The governor also got a copy. Even our U.S. senators and representatives got copies of *State of the World*, all inscribed with the words, 'From the students of Katella High School, Anaheim, California.'" ■

Big Brothers, Big Sisters

Level
- High School

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources
- Building Skills: Workshops, Courses, Inservice
- Networking With Other Educators
- Locating Funding: Grantwriting

"That's a dragonfly nymph, and that's a mayfly nymph. And, oh look, there's a dobson fly larva," the eager student explains to his 'little brother.' The students are a part of Miriam Turner's 'big brothers and big sisters' program which pairs Detroit Renaissance High School students with special needs students from nearby King Elementary School.

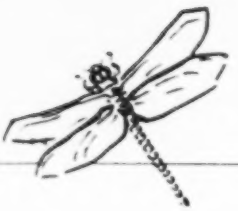
Miriam's students work in teams and are responsible for helping one or two of the King elementary school students learn the water quality tests. "Not only does this help my students to understand the material better, but it has helped them see the special needs students in a different light. Many of my students have remarked how good it feels to motivate and give a sense of self-esteem to their 'little brother or sister.'"

The partnership between Miriam's class and the King students extends beyond the water quality monitoring component. They communicate with one another over the EcoNet computer network. "Mainly they just ask each other how they are doing and what they are doing in school. But it's been a great way to teach both groups about using the computer as a communications tool."

Miriam Turner
Renaissance High School
6565 West Outer Drive
Detroit, Michigan 48235

Miriam has participated in the water quality program since it started five years ago. In addition to adding a 'big brothers and big sisters' component to the program, she has 'personalized' it with a variety of other twists. One year, her students acted as assistants for younger students at Taft Middle School. Three years ago, Miriam volunteered her class to participate in the pilot of a cross cultural partnership program, facilitated by the Global Rivers Environmental Education Network.

The cross cultural partnership program has brought a global perspective to Miriam's water quality monitoring unit. Her students trade letters and videos about their class, their school and the environment with their partner school, located in Sydney, Australia. They also share data about water quality and communicate about water quality problems and potential solutions. "We have all learned how, despite our differences in culture and geographical location, we have many of the same concerns and face many of the same challenges with regard to environmental issues," Miriam says.



As is evident from the water quality testing unit, Miriam employs a very hands-on approach to learning about Earth Sciences. She tries to take her classes on two or three field trips a month. Aside from the trip to perform water quality tests, they have visited the flood plains of the Rouge River, Detroit's waste water and drinking water treatment plants, and a local landfill. "It's important to take students on field trips to teach them about the environment and community they live in," Miriam explains.

Although the administration pays for her substitute teachers, Miriam must find the funds to cover the transportation costs. Given her school's tight budget situation, Miriam looks to outside funding sources. "I write a lot of grant proposals, lots and lots."

"It's important to take students on field trips to **teach** them **about the environment and community** they live in."

"When a professor at the University of Michigan first approached me about participating in the water quality monitoring project, I never would have guessed in my wildest dreams that my students would be so excited about a trip to the Rouge River, or that we'd be communicating with teachers and students in Australia," Miriam says. "And the parents are excited too. They say they really enjoy it when their children come home excited about school." ■

Recycling Snowballs

Each week, the parents of Jackie Hines' third-graders get a weekly update on their children's recycling project.

"I usually include a piece in it, thanking the parents for supporting their child's new interest," Jackie says. "It's hard for children to get adequate hands-on experience with environmental issues at school. That's why I think parental modeling is so important."

Level
- Lower Elementary

Story Focus
- Enlisting Community Support
- Locating Instructional Resources

It's not like Jackie's students aren't already letting their parents know about recycling. In class, students talk about their frustration after family trips to the town's lackluster recycling center.

"Kids say things like, 'My mom and I went to recycle, but the bins were full and spilling over!'" Jackie says. "Other children are honest about the fact that even if they save paper, their parents won't take them to the recycling center. Seven- and eight-year-olds are so trusting, honest and eager to please. They see that recycling is important, and want to get involved."

The children's enthusiasm for recycling has snowballed from the beginning. The children set up their own recycling system in the classroom. It made them appreciate that, even on a small scale, recycling requires effort and organization. At the same time, they were learning about local government. The children asked Jackie to write to city council about the municipal recycling system, and invite the mayor to come speak to their class. "We try to get the students involved in problem-solving with real-life issues, and the recycling issue really worked well," Jackie says.

Jackie Hines
Greenwood Elementary School
2300 Spruce St.
LaGrande, Oregon 97850

To prepare for the mayor's visit, the students listed questions about problems their families had with recycling. The mayor listened carefully to the children's concerns and explained budget issues at the heart of the drop-off center's problems. Yet another layer in the recycling problem-solving experience had been revealed.

Whenever possible, Jackie provides hands-on experience at school. In addition to recycling, she and her students look at ways to reduce and reuse classroom materials. "Instead of issuing the standard school supplies to every student each year, pencils, folders, etcetera, we try to get past that waste. We take a hard look at what supplies kids do and don't need, and we're really able to cut back. This of course led Jackie and her students into a discussion about supply and demand. . . and, so, the snowball keeps rolling! ■

Where Do Carrots Come From?

Rosa turns the corner onto 117th Street in Harlem, skipping 10 paces ahead of her mother. "C'mon Mom," she yells back, doing a little loop in her direction.

It's Saturday, but they're headed back to school, specifically the school garden. It's been a couple weeks since they planted corn, and Rosa can't wait to see if it sprouted. When they arrive, Rosa's teacher at Public School 155, Sandra Jenore, is preparing for next week's classes.

Level
- Lower Elementary

Story Focus:
- Enlisting Community Support
- Locating Instructional Resources
- Locating Funding: Fundraising
- Locating Funding: Grantwriting

The project started five years ago, when Sandra and a friend who has a grandchild attending the same school worked to convert a vacant city-owned lot next to P.S. 155 into a garden. The community planning board wanted to turn it into a parking lot. Sandra petitioned the city for the property and after a year of negotiation, the city cleaned out the lot and gave it to the school.

Each year, several classes plant vegetables and flowers. Each class gets an area, but there is also space for family plots. "It gives students a chance to do hands-on work, be outside and apply many concepts they learn in their classes," Sandra says, nodding toward the area where Rosa and her mother are gloating over their newly sprouted corn. "It's great to involve the parents in a school project."

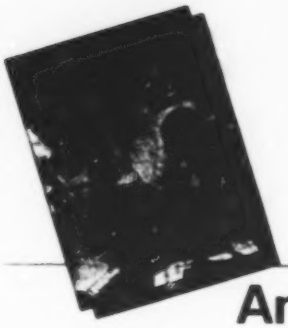
The kids, of course, learn a great deal, from simple to complex ideas. "It's amazing because I've had instances where a student doesn't know what to do with the vegetables we grow," Sandra says. "One little girl, who participated in the whole process of planting and harvesting carrots, did not want to eat them. She thought they were too dirty, because they had been in the ground. She had no idea where carrots came from."

Sandra Jenore
Public School 155
319 E. 117th
New York, New York 10035

The garden has certainly been a highlight for the school, but it takes on-going financial support. Sandra began the garden with material from Cornell Extension Services and the city Parks Department. They sent seeds, tools, bulbs and flowers. Since then, she has written several grant proposals, including a recent one for a birdbath. "We're hoping to entice cardinals or blue jays, over from Central Park to our garden," Sandra says. "Anything other than pigeons."

Along with their curricular activities, Sandra's students raise money for garden supplies by collecting and recycling cans and aluminum foil. They also hope to buy magnifying glasses and butterflies.

"It's nice to add new elements to our garden," Sandra says. "And the kids are really excited. It's terrific when someone runs in on a Monday morning and announces that the tulips have bloomed or the beets have sprouted. I guess you know you're on the right track when the kids get interested in plants and figure out just where their food comes from." ■



An Interested and Energetic Force

Level
- Elementary

Story Focus
- Enlisting Administrative Support
- Enlisting Community Support
- Locating Instructional Resources
- Networking With Other Educators

From the right side of the Fort Benning School Auditorium, a tall, middle-aged woman dressed in a penguin costume begins to waddle across the stage. "You may think I slide through Antarctic ice, far from industrial-waste. But just a taste of poisoned fish swimming in haste through an oil slick can end my faith in nature's harmony. Everything on this planet is interdependent. . . " As the crowd applauds, another person, Jerry Christy, steps up to the microphone and delivers a short description of the ecological roles penguins play, complete with statistics and anecdotes from scientists, politicians, explorers and fellow educators.

Twelve years ago, Jerry was a member of the Science Education Curriculum Committee that recommended, developed, and implemented environmental education in the K-8 science curriculum. Presently he is the math, science and technology curriculum coordinator for the Fort Benning schools. "Of course, we can't do a presentation like the one we did on Antarctica for every subject, but occasionally it serves to bring together the community, students and teachers," he says.

The event was a smashing success. The idea came from a weeklong institute on Antarctica he attended in St. Paul, Minnesota with a social studies teacher. They returned wanting to combine lessons on Antarctica with presentations by school volunteers, from teacher aides to assistant superintendents.

Jerry Christy
Fort Benning Schools
P.O. Box 1967
Fort Benning, Georgia 31905

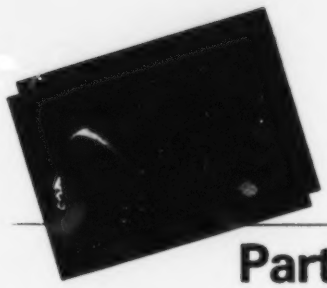
When Jerry was given the task of making environmental education part of the school curriculum, he was teaching fifth-and sixth-grade science. Then he could test environmental topics daily to find out what interested students and what topics were manageable in classroom settings. "Once the curriculum was developed and I began working with kids, their obvious enthusiasm for environmental topics was energizing. Never before had I seen students get so involved and committed in their efforts."

Although Jerry's present position is administrative, he spends a good portion of his time working with teachers and students on a consulting basis, helping to design and implement environmental education projects. "Many of these feature telecommunications," he says. "There is the International Arctic Project, for which we are one of the development-team schools and have come up with a study project related to land use and habitat displacement. We're also involved in two of the National Geographic Kids' Network projects (on weather and acid rain), and are building a 20-foot by 35-foot fully functional greenhouse for Project Green Thumb. Ideas and recommendations for projects often come from faculty members. Three teachers proposed the idea of the greenhouse.

Jerry likes matching Fort Benning's environmental education program with wider objectives. "The most interesting aspect of the process has been the realization that our original focus on teaching teachers a new way of doing things was not enough. We also have to teach students a new way," he says. "From about third grade on, they have a sense of what school is 'supposed' to be and how it is to be 'played'. What we are providing them violates the rules, and students can sometime feel uneasy with it."

Jerry sees a bright future for environmental education at Fort Benning. "Luckily, we have a very supportive school board and professional development program for faculty and staff. That's one of the things that's so invigorating about environmental education — it pulls together the various sections of the community into one interested and energetic force," he says. ■

"From about third grade on, they have a sense of **what school is 'supposed' to be** and how it is to be 'played'. What we are providing them violates the rules, and students can sometime feel uneasy with it."



Partners in Philanthropy

"It's not so unusual to hear the cry 'dead ants, dead ants' coming from some of the classrooms of the Mast Landing School," Margaret Pennock explains as we walk down a hallway filled with elementary school students. "And if it's not 'dead ants, dead ants,' it's 'boogie woogie, boogie woogie'!" Margaret shakes her head and laughs as she recalls the semester two years ago when she developed Partners in Philanthropy.

Level
- Upper Elementary

Story Focus
- Enlisting Administrative Support
- Locating Funding: Grantwriting

"The students struggled through the process of deciding what non-profit group in their state should receive a $10,000 grant," she says. "'Dead ants' and 'boogie woogie' were only a small part of this amazing process."

The one-time project began when the principal circulated a letter from the Maine Community Foundation, expressing the foundation's interest in giving youth groups an opportunity to improve the quality of life in Maine. The foundation wanted to give students the responsibility of deciding where to donate a $10,000 foundation grant. The only restrictions were that this group of young students receiving the grant had to be non-profit, located in the state of Maine, and the money had to be given to one group ($10,000), or to two groups ($5,000 each).

Margaret Pennock
Mast Landing School
Soule Program
Bow Street
Freeport, Maine 04032

"I really felt such an opportunity fit nicely with the school's philosophy of giving kids real responsibility and providing them with real decision-making situations," Margaret explains. "When I received the grant of $10,000, to give away, I decided to make the decision of where to give the money the focus of my interdisciplinary unit for that semester. I called the unit Partners in Philanthropy."

"One of the most amazing aspects of it was that my role was solely that of facilitator," she says. "I presented the group with options when asked, but never gave my opinions. More than anything else, Partners in Philanthropy was about developing group process skills."

First, the group established their possible areas of concern, which they narrowed to two issues: the environment and animal rights. They used the "Alternative Yellow Pages" of Maine to find and research groups in Maine working on these issues. As they got down to specifics, discussions grew tense as students were forced to really listen to what others had to say.

"That's where 'dead ants' and 'boogie, woogie' came from," Margaret explains. "We made it our policy that whenever the group confronted what seemed like an insurmountable mental block, someone could shout 'dead ants, dead ants' or 'boogie woogie' and everyone would scatter to the floor and lie on their backs, jiggling their hands and feet into the air. The comic relief worked wonders," Margaret recalls with a chuckle bordering on disbelief. "It really, really, worked. And the students were very responsible about using it. They used it only when they really were confronting a block and not as a way to have fun for the sake of having fun."

The students devised their own criteria for selecting the group. "They knew that the group needed to fulfill the stipulations of the Maine Community Foundation," Margaret says, "but they also felt very strongly that the group was not to use the money primarily for administrative purposes, and the group had to have direct impact on the problems that they worked on." The students then debated whether their decision was going to be by consensus, majority vote or even picking a name out of a hat. They decided it would be by consensus.

"A great **whoop of delight** filled the air and **the class erupted** in a spontaneous chorus of **'boogie woogie'**!"

After days of tough discussions, they came up with two potential groups: The Animal Rights Protection Group of Maine and the Children's Rainforest. They arranged for interviews of representatives of each group. "Although they were a bit shaky at first, they quickly centered in on those things that were most important to their decision. They asked some hard questions like 'What would happen to the money if that group got it?' and 'How much would be spent on office overhead?' They really grilled those reps!," Margaret says.

Deliberations about the final choice continued into the last day of the class. "The group had long before agreed that the final decision should be by consensus, and two of the students weren't fully comfortable with the majority view. I sensed that the group was growing tense, and that the pressure was beginning to mount on two students to change their opinions. It was amazing just how quiet that room got. I was beginning to fear for the worse; that no decision was going to be made. Or worse yet, I was afraid that the two dissenters would be pressured into changing their minds and forever be dissatisfied with the group outcome.

The group was definitely confronting its most serious challenge of the program. But just when things seemed hopeless, one of the students spoke up in defense of the two dissenters' right to not agree with the majority and asked everyone to re-think their decision. That really was a turning point. Until that point, the group hadn't really recognized the validity of other opinions as they struggled toward getting everyone to agree with the majority.

"I had struggled with whether to step in and encourage the group along in this direction. But I had long before stepped aside as facilitator and I felt strongly that it was more important that they struggle with the process themselves than to force a decision. As it turned out, once the two dissenters felt that the other members of the group were respecting their opinions, things began to move. I was very impressed with the way those kids worked this issue out amongst themselves. I mean, that's a very difficult thing even for adults working in groups to do!"

With ten minutes left in the last class, the two dissenters said that although they still disagreed with the group's decision they felt it was more important that the group be able to give the money to someone and they voted in favor of the group's decision. The group had reached consensus. They would donate the money to the Children's Rainforest. "A great whoop of delight filled the air" says Margaret, "and the class erupted in a spontaneous chorus of 'boogie woogie'!" ■

Resource Indices

National Non-Profit Environmental Organizations

American Oceans Campaign
725 Arizona Avenue, Suite 102
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(310) 576-6162

Adopt A Stream Foundation
P.O. Box 5558
Everett, WA 98201
(206) 388-3313

Carrying Capacity Network
1325 G Street NW, Suite 1003
Washington, DC 20005
(202) 879-3045

The Center for Economic Conversion
222 View Street
Mountain View, CA 94041-1344
(415) 968-8798
Fax (415) 968-1126

The Center for Marine Conservation
1725 DeSales Street, NW, Suite 500
Washington, DC 20036
(202) 429-5609

The Conservation Fund
1800 North Kent Street
Suite 1120
Arlington, VA 22209
(703) 525-6300

The Cousteau Society
870 Greenbrier Circle
Suite 402
Chesapeake, VA 23320
(804) 523-9335

Environmental Defense Fund
257 Park Avenue South
New York, NY 10010
(212) 505-2100

The Environmental Exchange
1718 Connecticut Ave. NW
Suite 600
Washington, DC 20009
(202) 387-2182

Global Tomorrow Coalition
1325 G Street, NW
Suite 915
Washington, DC 20005-3104
(202) 628-4016

Global Releaf
Director of Education
P.O. Box 2000
Washington, DC 20013
(202) 667-3300

Izaak Walton League of America
1401 Wilson Boulevard
Level B
Arlington, VA 22209-2318
(703) 528-1818

Keep America Beautiful Inc.
Mill River Plaza
9 West Broad Street
Stamford, CT 06902
(203) 323-8987

League of Conservation Voters
1707 L Street, NW
Suite 550
Washington, DC 20036
(202) 785-8683

National Audubon Society
700 Broadway
New York, NY 10003
(212) 979-3000

The National Geographic Society
1145 17th Street, NW
Washington, DC 20036
(202) 857-7000

The National Institute for Urban Wildlife
10921 Trotting Ridge Way
Columbia, MD 21044
(410) 995-1119

National Parks and Conservation Association
1776 Massachusetts Avenue
Washington, DC 20036
(202) 223-6722

National Toxics Campaign
29 Temple Place
5th Floor
Boston, MA 02111
(617) 482-1477

National Wildlife Federation
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Washington, DC 20036-2266
(703) 797-6800

The Nature Conservancy
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Arlington, VA 22209
(703) 841- 5300

North American Association for Environmental Education
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Population-Environment Balance
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Project Eco-School
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Renew America
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(202) 232-2252

The Sierra Club
730 Polk Street
San Francisco, CA 94109
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Soil Conservation Society of America
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World Resources Institute
1709 New York Avenue, NW
Washington, DC 20006
(202) 662-3085

Worldwatch Institute
1776 Massachusettes Avenue, NW
Washington, DC 20036
(202) 452-1999

The World Wildlife Fund
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Washington, DC 20037
(202) 293-4800

Zero Population Growth
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Suite 320
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State, Regional and Territorial Environmental Education Associations and Organizations

This list includes information compiled by the North American Association for Environmental Education and U.S. Environmental Protection Agency Regional Environmental Education Coordinators.

As of 1993, these states do not have an EE organization or association. The individuals listed serve as EE contacts for their area.

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Wahoo, Nebraska 68066-0265

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New Mexico Environmental
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Association of South Carolina
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Florence, SC 29501

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West Virginia Conservation
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Wisconsin Association for
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7290 County MM
Amherst Junction, Wisconsin 54407

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Wyoming Association
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Education
c/o Wyoming Conservation Connection
P.O. Box 3992, WYO Hall
University of Wyoming
Laramie, Wyoming 82071-3992

Director
Wyoming Outdoor Council
210 West Main Street
Lander, Wyoming 82520

Wyoming Conservation Association
Math Science Teacher Resources
University of Wyoming
Laramie, Wyoming 82070

TVA-Sponsored Environmental Education Centers

Bear Creek Watershed Environmental Education Project
Mr. Allan M. O'Neal, Jr., Director
Russellville, AR 35653

Cedar Creek Learning Center
Mr. Doug Ratledge, Director
Greene County Schools
910 W. Summer Street
Greeneville, TN 37743

Center for Environmental/ Energy and Science Education
Dr. Charles R. Rhyne, Director
Plant Science Building
Jackson State University
Jackson, MS 39217

Center for Environmental/ Energy Education
Ms. Jill Norvell, Director
College of Education, Room 415B
Memphis State University
Memphis, TN 38152

Center for Environmental/ Energy Education
Dr. Patrick Doyle, Director
Dr. John Duboise, Co-Director
Middle Tennessee State University
Murfreesboro, TN 37132

Mississippi Cooperative Extension Service
Mr. Jim Yonge
Mississippi State University
Mississippi State, MS 37926

Center for Environmental Education
Dr. Ruth Jacquot, Director
Murray State University
Murray, KS 42701

Center for Science, Mathematics, and Environmental Education
Dr. Susan P. Gannaway, Director
Education Building, Room 306
North Georgia College
Dahlonega, GA 30597-9990

Center for Environmental/ Energy Education
Dr. Joe Sharp, Director
301 Bartoo Hall
Tennessee Technological University
Cookeville, TN 38505

Center for Environmental Education
Dr. Ed Cox, Director
Dr. Jackie Batson, Co-director
Tennessee Wesleyan College
Athens, TN 37303

Center for Environmental/ Energy Education
Mr. Bernard Levine, Director
Wilson Hall, Room 201
University of Alabama in Huntsville
Huntsville, AL 35899
(205) 895-6272

Center for Environmental, Energy, and Science Education
Dr. Earl Gardner, Director
Dr. Mary Lou Meadows, Co-Director
Math Building
The University of North Alabama
Florence, AL 35632-0001

Center for Environmental, Energy, and Science Education
Dr. Bernard Benson, Director
Room 204, Hunter Hall
The University of Tennessee-Chatanooga
Chatanooga, TN 37403

Center for Environmental/ Energy/ Science Education
Dr. Webb Slawson, Director
Dr. Rosalyn McKeown-Ice, Co-Director
Claxton Addition 319
The University of Tennessee-Knoxville
Knoxville, TN 37996-3400

Center for Environmental and Conservation Education
Dr. Maurice Field, Director
The University of Tennessee at Martin
210 Frank Clement Hall
Martin, TN 38238

Center for Environmental/ Energy/ Education
Dr. Richard C. Berne, Director
Natural Sciences Building, Room 333-A
Western Carolina University
Cullowhee, NC 28723

Center for Math, Science, and Environmental Education
Dr. Terry Wilson, Director
Mrs. Joan Martin, Program Coordinator
403 Tate C. Page Hall
Western Kentucky University
Bowling Green, KY 42101

US EPA

U.S. Environmental Protection Agency
Environmental Education Division
(1707)
401 M Street, SW
Washington, DC 20460
(202) 260-4962 or (202) 260-4965

U.S. Environmental Protection Agency
Public Information Center
401 M Street, SW
PM-211B
Washington, DC 20460
(202) 260-7751

US EPA Regional Environmental Education Coordinators

Region 1–CT, ME, MA, NH, RI,VT
Maria V. Pirie
U.S. EPA, Region 1
JFK Federal Building (RPM)
Boston, MA 02203
(617) 565-9447

Region 2–NJ, NY, Puerto Rico, Virgin Islands
Teresa Ippolito
U.S. EPA, Region 2
26 Federal Plaza (Room 905)
New York, NY 10278
(212) 264-2980

Region 3–DE, DC, MD, PA, VA, WV
Bonnie Smith
U.S. EPA, Region 3
841 Chestnut Street (3EA 20)
Philidelphia, PA 19107
(215) 597-9825
For publications call:
(215) 597-2176

Region 4–AL, FL, GA, KY, MS, NC, SC, TN
Rich Nawyn
U.S. EPA, Region 4
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-3004

Region 5-IL, IN, MI, MN, OH, WI
Suzanne Saric
U.S. EPA, Region 5
77 West Jackson Boulevard (PI-19J)
Chicago, IL 60604
(312) 353-3209

Region 6–AR, LA, NM, OK, TX
Sandy Sevier
U.S. EPA, Region 6
1445 Ross Avenue (6X)
Dallas, TX 75202
(214) 655-2204

Region 7–IA, KS, MO, NE
Rowena Michaels
U.S. EPA, Region 7
726 Minnesota Avenue
Kansas City, KS 66101
(913) 551-7003

Region 8–CO, MT, ND, SD, UT, WY
Cece Forgét
U.S. EPA, Region 8
Denver Place
999 18th Street
Suite 500 (80 EA)
Denver, CO 80202-2466
(303) 294-1113

Region 9–AZ, CA, HI, NV, American Samoa, Guam, Pacific Trust Territories
Ida Tolliver
U.S. EPA, Region 9
75 Hawthorne Street (E2)
San Francisco, CA 94105
(415) 744-1581

Region 10–AK, ID, OR, WA
Sally Hanft
U.S. EPA, Region 10
1200 Sixth Avenue (SO-141)
Seattle, WA 98101
(206) 553-1207

Appendices

Appendix A-1:

Select Instructional Material in Environmental Education

For All Grades

Conserving Soil.
USDA Soil Conservation Service. Available from the National Association of Conservation Districts Service Dept., P.O. Box 855, League City, Texas 77573-9989.

> Includes color transparencies, ditto masters, activities, and background information to help teachers convey information about soil and its wise use.

The Kid's Guide to Social Action.
Barbara A. Lewis, 1991. Free Spirit Press, Minneapolis, Minnesota.

> The *Kid's Guide* is an easy-to-use guide to social action. It includes stories about real kids that have made a difference, step-by-step guides to social action skills, ready-to-use tools, and an up-to-date resource guide.

Humanizing Environmental Education: A Guide for Leading Nature and Human Nature Activities.
Clifford Knapp and Joel Goodman, 1981. Published by and available from the American Camping Association, Martinsville, Indiana 46151.

> This is an excellent resource for building a sense of community among a group of people in an environmental setting (i.e., camp) or classroom. Hundreds of valuing and affirming activities accompany the text on humanistic education.

Our Great Lakes Connection: A Curriculum Guide for Grades Kindergarten Through Eight.
Lynn Entine, 1985. Wisconsin Sea Grant Program of the University of Wisconsin, Environmental Resources Center, 216 Agricultural Hall, 1450 Linden Dr., Madison, Wisconsin 53706.

> Twenty-four creative classroom activities take science, social studies, music, and language to the Great Lakes through investigations of sand, navigation, voyageurs, immigrants, mining, shipping, and toxic chemicals. Each activity includes some background, procedures, extensions, handouts, and a list of resources.

Project Learning Tree: Supplemental Activities for Grades pre-K through 8 and Educational Modules for Grades 7 through 12.
Western Regional Environmental Education Council and the American Forest Foundation. American Forest Foundation, Washington, DC. Available only through a six hour workshop. Contact PLT for the name

of the PLT coordinator in your state. Project Learning Tree, 1111 19th Street, NW, Suite 800, Washington, DC 20036. (202) 463-2462.

PLT uses trees as the vehicle for exploring our use of forest resources and interdependence in an easy-to-use interdisciplinary activity manual. Each activity includes learning objectives, background information, and a list of suggested extension activities. Included is an excellent bibliography and cross reference guide. New materials include thematic modules for older students.

Project WILD: Activity Guides for Grades K through 12

Western Regional Environmental Education Council, 1992. Available only through a six hour teacher workshop. Contact Project WILD, 5430 Grosvenor Lane, Bethesda, Maryland 20814, (301) 493-5447 for the name of the Project WILD Coordinator in your state.

The project WILD activity guide is a set of interdisciplinary activities based on wildlife, animal ecology, and the human connection to wild animals. A second guide, Aquatic WILD, focuses on water-related wildlife activities. Each activity includes learning objectives, background information, and a list of suggested extension activities.

Project WET

Available only through a six hour teacher workshop. Culbertson Hall, Montana State University, Bozeman, Montana 59717-0057. Call (406) 994-5392 for the name of the Project WET Coordinator in your state.

Project WET is a set of interdisciplinary activities based on water quality and water ecosystems. Each activity includes learning objectives, background information, and a list of suggested extension activities.

Standing Tall

The Giraffe Project. 1990. Langley, Washington. The Giraffe Project, Box 759, Langley, Washington 98260. (206) 221-7989.

The Giraffe Project is a national organization inspiring people to stick their necks out for the common good. *Standing Tall* is a service-learning program helping students in grades K-12 to build confidence in their abilities to take thoughtful action to better the world around them; to develop an enduring vision that service and good citizenship are essential parts of a meaningful life; and to acquire critical skills in thinking, decision-making, leadership and cooperation. Each teaching guide includes a complete set of lesson plans, student handouts and enrichment ideas.

Touch a Tree, Forest in My Classroom, and other publications.
Western Education Development Group, Faculty of Education, University of British Columbia, Vancouver, BC V6T 1Z5.

A wonderful series of resource books was written by teachers, for teachers on a wide variety of topics: *Touch a Tree, Forest in my Classroom, Forest Appreciation, There's Dirt in the Forest, Stump Book, Seeing Through the Trees, Measuring the Forest, Rain Book, Snow Book, Pond Book, Lake Book, Herbal Happening, Art Starts Outdoors, etc.*

Instructional Materials in Environmental Education for Elementary Teachers

Acclimatization, 1974
Acclimatizing, 1972
Sunship Earth, 1979
Earth Education: A New Beginning, 1990
Steve Van Matre. American Camping Association, Martinsville, Indiana and the Institute for Earth Education, Box 288, Warrenville, Illinois 60555.

Van Matre first popularized the sensory approach to environmental study. *Acclimatizing* and *Acclimatization* describe short activities and adventures to discover the outdoors. *Sunship Earth* is a carefully structured five-day residential outdoor program. The magic and discovery are still there, but the emphasis is on the larger picture of ecology and human interactions.

Connections: A Curriculum in Appropriate Technology for the Fifth and Sixth Grades.
Written in 1980 by and available from the National Center for Appropriate Technology, P.O. Box 3838, Butte, Montana 59701.

This activity guide for elementary teachers provides exciting ideas and information in solar energy, water conservation, transportation, recycling, nutrition, and gardening–a good beginning for understanding many current issues.

Food First Curriculum.
Laurie Rubin. 1984. Published and available from the Institue for Food and Development Policy, 1885 Mission Street, San Francisco, California 94103.

Population pressures, resource distribution, development, and lifestyle choices are integral to our global food and hunger dilemma. This curriculum, targeted to 6th grade but easily adapted, sensitively explores these issues. Differences in cultures, sources of food, the food distribution system, causes of hunger in the Third World and the U.S.A., and avenues for change are addressed in activities with teacher information, handouts, objectives, and evaluation.

Hug A Tree and Other Things to Do Outdoors with Young Children
Robert E. Rockwell, Elizabeth A. Sherwood, and Robert A. Williams, 1983. Gryphon House, Inc., Mt. Rainer, Maryland.

One of the first EE manuals for very young children, this book guides teachers through a variety of outdoor and indoor activities that strengthen youngsters' skills in matching, comparing, observing, and exploring.

Keepers of the Animals, 1991.
Keepers of the Earth, 1989.
Michael J. Caduto and Joseph Bruchac. Fulcrum Publishing, Golden, Colorado 80401.

Each book is a collection of Native American stories with related activities, promoting responsible stewardship toward all animals on earth.

Living Lightly in the City. Volume I for grades K-3, Volume II for grades 4-6.
Maura O'Connor and Kathy McGlauflin, 1990. Published by and available through Schultz Audubon Center, 1111 East Brown Deer Road, Milwaukee, Wisconsin 53217.

Living Lightly in the City presents background information and teaching activities that help students understand the connections that maintain ecosystems.

NatureScope
National Wildlife Federation, 1412 Sixteenth Street, Washington, D.C. 20036. (800) 822-9919.

NatureScope targets a different area of the environment in each issue: wetlands, mammals, pollution, birds, deserts, rainforests, weather, insects, etc. Each 64 page booklet is packed with teacher background, interdisciplinary activity ideas, resources, handout masters, and ideas to extend the theme.

Nature With Children of All Ages.
Edith Sisson. 1982. Englewood Cliffs. New Jersey.

Earthworm races, seed planting, aging a tree, winter temperature, migration reporting, and water testing, are some of the many activity ideas that fill this 200 page guide to nature study. It includes good ideas for elementary outdoor explorations.

Ocean: Consider the Connections.
Center for Environmental Education, 1985. Center for Environmental Education, 6624 9th Street, Washington, D.C. 20001.

Information and activites on our global waterways: waves, tides, animals, adaptations, ecosystems, and people are covered.

Outdoor Biological Instructional Strategies–OBIS.
Lawrence Hall of Science, University of California, Berkeley, CA. Available through Delta Education, Box M, Nashua, New Hampshire 03061.

This program promotes the understanding of biological and ecological relationships. Hands-on activities emphasize both the natural and built environments. Activities are packaged according to common themes: deserts, birds, school site, etc.

Sharing the Joy of Nature, 1989.
Listening to Nature, 1987.
Sharing Nature With Children, 1979.
Joseph Bharat Cornell. Ananda Publications, Nevada City, California.

The assortment of nature games and philosophy included in these books encourages youngsters and adults alike to increase their awareness of the world through direct experiences–like listening to tree heartbeats, following a soaring hawk, or stalking wild animals. The activities require no complicated equipment or expertise–just a sensitivity to people and nature.

Ten-Minute Field Trips: Using the School Grounds for Environmental Studies.
Helen Ross Russell, 1991. National Science Teachers Association, Arlington, Virginia.

Can't get a bus for a field trip? Your own school grounds are probably filled with days of environmental explorations. Trees, bugs, birds, worms, heat, and light are only some of the topics addressed in this information guidebook. Teacher preparation and field trip possibilities are listed.

Instructional Materials in Environmental Education for Middle and High School Teachers

Bags, Beakers, and Barrels: An Action Curriculum Toward Solving Hazardous Materials Issues for Middle and High School Students.
Industrial States Policy Center, 1987. Industrial States Policy Center, 17 Brickel, Columbus, OH 43215.
(614) 224-4111.

This guide enables teachers to help students understand hazardous materials, their usefulness, their danger, and their typical disposal pattern. The final chapter provides guidelines for developing an action project to help resolve local concerns about these materials.

Earth Matters: Studies for our Global Future, 1991.

USA by Numbers, 1984.

For Earth's Sake: Lessons in Population and the Environment, 1989.
Zero Population Growth, 1400 16th Street, NW, Suite 320, Washington DC 20036, (202) 332-2200.

Zero Population Growth (ZPG) offers packets of activity ideas for approaching the sensitive issues of the environmental consequences of human population growth. Earth Matters, for example, provides background reading and activities on environmental issues at the secondary level. USA By Numbers uses census data to explain trends in environmental and social conditions.

The EarthTime Project.
Written in 1992 by and available from The EarthTime Project, P.O. Box 1111, Ketchum, ID 83340. (208) 726-4030.

EarthTime is a program that stresses critical thinking skillls, personal responsibility, empowerment, and a hands-on approach to teaching environmental education. This program represents a blueprint for converting schools into models of environmental responsibility and affecting significant lifestyle changes among program participants. Based on issues that can be addressed at the school: energy conservation, water use, pesticides, etc.

Investigating and Evaluating Environmental Issues and Actions; Skill Development Modules and other publications.
Harold R. Hungerford, Ralph A. Litherland, R. Ben Peyton, John M. Ramsey, Audrey N. Tomera, and Trudi L. Volk, 1985. Stipes Publishing Company, 10-12 Chester Street, Champion, IL 61820.

Written for middle school students, these skill development modules lead students through issue identification, values analysis, researching questions with serveys and questionnaires, and analyzing an issue for potential action.

Living Lightly on the Planet Volume I for grades 7-9, Volume II for grades10-12.
Maura O'Connor, 1991. Published by and available through Schultz Audubon Center, 1111 East Brown Deer Road, Milwaukee, WI 53217.

Living Lightly on the Planet presents background information and teaching activities that help students understand the connections that maintain ecosystems.

Preparing for Tomorrow's World: Decisions for Today and Tomorrow.
Louis Iozzi and Peter Bastardo, 1987. Available from Sopris West Inc., 1140 Boston Avenue, Longmont, Colorado, 80501.

A series of Science-Technology-Society modules that focus on issues such as nuclear energy, genetic engineering, acid rain, and hazardous waste. Issues are presented with background readings, questioning strategies, and case studies.

Sustainable Economics: A Supplementary Curriculum for High School Economics Courses.
The Center for Economic Conversion, 222 View Street, Suite C, Mountain View, California 94041-1344. (415) 968-8798.

Sustainable Economics presents an introduction to a variety of economic systems and includes a critical analysis of contemporary industrial-capitalism. Written by San Francisco Bay Area high school economics teachers, *Sustainable Economics* includes five lesson plans and eleven activities which focus on contemporary, relevant topics for discussion.

Taking Sides: Clashing Views on Controversial Environmental Issues, and Instructor's Manual for Taking Sides: Clashing Views on Controversial Environmental Issues.
Theodore D. Goldfarb. Available from Dushkin Publishing Group, Sluice Dock, Guildford, Connecticut 06437. (800) 243-6532.

Taking Sides presents two opposing points of view on a series of eighteen controversial environmental issues such as reauthorization of the Endangered Species Act, the need for widespread use of pesticides to feed an increasing world population, and the need for aggressive international efforts to slow global warming. The Instructor's Manual includes a synopsis of each author's position on the issue, teaching suggestions, and multiple-choice and essay questions. The teaching hints consist of suggestions for generating class discussion around the themes raised by the clashing essays.

Training Student Organizers Curriculum.
Zamm, Michael, Robert Ortner, and Beverly DeAngelis, 1990. Available from the Council on the Environment of New York City, 51 Chambers Street, Room 228, New York, New York 10007. (212) 788-7900.

The curriculum shows teachers, youth leaders, and community activists how to organize environmental improvement projects in neighborhoods, schools, and homes. It contains step-by-step lesson plans for organizing anti-litter campaigns, recycling programs, energy conservation programs, open space projects and many others.

Tropical Forests.
Population.
Biological Diversity.
Consider the Connection.
Citizen's Guide to Global Issues *(background information).*
Global Tomorrow Coalition, 1325 G Street NW, Suite 915, Washington D.C. 20005.

Global Tomorrow Coalition is publishing a series of packets for teachers–background information, activity ideas, and handouts on environmental issues of global significance.

Understanding the Game of the Environment: An Illustrated Guide to Understanding Ecological Principles.
(Agricultural Information Bulletin No. 426)
David R. Houston, 1979. US Forest Service, US Department of Agriculture, Washington D.C.

Here is an ecological text published for high school students. Major ecological principles are summarized and organized into a game, complete with players, rules, boundaries, etc. Detailed illustrations provide the basis for in-depth discussions.

Appendix A-2: Select Examples for Your EE Library

Resource Books in Education and Environmental Issues

The Cousteau Almanac: An Inventory of Life on our Water Planet.
Jacques Ives Cousteau and Cousteau Staff, 1981. Doubleday Company, New York.

The *Almanac* is a treasure of information on environmental issues around the world in the 1980's. Articles are superbly written, well documented, and arranged in an unique order. Scattered throughout are vignettes of people and organizations who work toward the solutions to environmental problems, usually on a local level, and usually successful. The last section provides information on organizing around an issue and taking action.

Environmental Science: An Introduction, 1988 *(second edition)*.
Living in the Environment: An Introduction to Environmental Science, 1990 *(fourth edition)*.
G.Tyler Miller. Wadsworth Publishing Company, Belmont, California, 1986.

Both texts fairly represent the variety of perspectives that color environmental issues. *Environmental Science* covers the issues in less depth than *Living in the Environment.* Written for the college student.

Environmental Issues Forum (EIF).
North American Association for Environmental Education, P.O. Box 400, Troy, Ohio 45373.

The EIF is a program with a series of booklets providing background information on, and initiating discussion of, current environmental issues. Two EIF books are currently avilable: "The Solid Waste Mess: What Should We Do With Our Garbage?" and "The Wetlands Issue: What Should We Do With our Bogs, Swamps, and Marshes?" A "Moderator's Guide" is also available to help you set up, publicize, and run a forum or study circle.

Environmental Science: A Framework for Decision Making.
Daniel D. Chiras, 1985. The Benjamin/Cummings Publishing Company, Inc., Menlo Park, California.

This text presents a current, comprehensive, and holistic overview of critical environmental issues useful to readers with little or no background in science. Written for the college student.

The Environment Source Book.
Sources Annuals.
Greenhaven Press, P.O. Box 289009, San Diego California 92198, (800) 231-5163.

A compilation of brief articles arguing environmental issues from across the political spectrum. Several articles on each of 14 topics; authors from William Buckley to Jeremy Rifkin.

The Global Citizen.
Donella Meadows, 1991. Island Press, Washington, D.C.

The Global Citizen is a collection of over 80 newspaper articles written by Meadows for her syndicated column, Global Citizen. In simple and eloquent language, she discusses the global environment, the beauty of nature, the treasure of simplicity, the successes happening, and the hopeful solutions that lie ahead.

The Global Ecology Handbook.
The Global Tomorrow Coalition, 1990. Beacon Press, 25 Beacon St, Boston, Massachusetts 02108-2800.

This handbook, a practical supplement to the PBS series *Race to Save the Planet*, is designed to help overcome the political, social, and economic obstacles that continue to retard progress toward solutions to environmental problems. Among other things the Handbook: provides basic facts about global population, resource, and environmental problems; demonstrates how these problems are interrelated; shows how the problems affect the lives of citizens in the United States and other countries; suggests how individuals and groups can participate in acheiving solutions.

A Guide on Environmental Values Education.
Michael Caduto. UNESCO, Paris France, 1985. Available from Michael Caduto, P.O. Box 1052, Norwich, Vermont 05055.

This slim, well-written manual includes background and theory on attitude formation, moral development, values clarification, and other valuing strategies. Two chapters describe environmental values activities for younger and older students that should contribute to their moral development.

The Handbook of Nature Study.
Anna Botsford Comstock, 1939, 1967, 1974. Cornell University Press, Ithaca, New York.

This classic reference was first published in 1911 from the stronghold of the natural history movement. It is still one of the best sources of natural history information and tidbits available. Comstock's observations of animal behavior are thorough and delightful to read.

State of the World (published annually)
Lester Brown, et al. W.W. Norton, New York. Available from Worldwatch Institute, 1776 Massachusetts Avenue NW, Washington, DC 20036.

The tenth volume in a series, this annual report produced by the Worldwatch Institute is an invaluable resource of up-to-date information on the environment.

World Resources 1992-93 (Updated annually).
Teacher's Guide to World Resources 1992-93: Comprehensive Coursework on the Global Environment.
World Resources Institute. 1709 New York Avenue, NW, Washington, DC 20006, (202) 638-6300.

Activities, graphs, and information in this booklet enhance the global data available in World Resources 92-93. Teachers can use these units on wetlands, biodiversity, etc., to develop a secondary course or unit.

The Wholeschool Book: Teaching and Learning Late in the 20th Century.
Bob Samples, Cheryl Charles, and Dick Barnhart, 1977. Addison-Wesley Publishing Company, Reading, Massachusetts.

This book offers a humanistic, people-oriented philosophy of education complete with suggestions for questions, discussions, and activities that encourage students to participate in the learning process.

Academic/Professional Work in Environmental Education

The Journal of Environmental Education
Heldref Publications, 1319 18th Street, NW, Washington, DC 20036.
(800) 365-9753

The Environmental Communicator
NAAEE, P.O. Box 400, Troy Ohio 45373.
(513) 676-2514

NAPEC Quarterly
National Association of Professional Environmental Communicators
P.O. Box 61-8352
Chicago, IL 60661-8352

Periodicals for Teachers and Students

Ranger Rick, National Wildlife, and ***International Wildlife***
National Wildlife Federation
8925 Leesburg Pike
Vienna, VA 22184-2266
(703) 790-4482

National Geographic World
National Geographic Society
17th and M Street NW
Washington D.C. 20036
(202) 857-7000

Owl and ***Chickadee***
The Young Naturalist Foundation
56 The Esplanade, Suite 306
Toronto, Ontario, M5E 1A7,
Canada.
(416) 868-6001

World Watch Papers
Worldwatch
Worldwatch Institute
1776 Massachusetts Ave. NW
Washington D.C. 20036
(202) 452-1999

The Amicus Journal
National Resources Defense Council
40 W. 20th Street
New York, NY 10011
(212) 727-2700

EE News: Environmental Education in Wisconsin
WI Department of Natural Resources
Box 7921
Madison, WI 53707-7921

Audubon
National Audubon Society
700 Broadway
New York, NY 10003
(212) 979-3000

Sierra Magazine
The Sierra Club
730 Polk Street
San Francisco, CA 94109
(415) 776-2211

Green Teacher
95 Robert Street
Toronto, Ontario M5S 2K5
Canada

Environmental Action
Environmental Action
6930 Carroll Avenue, Suite 600
Takoma Park, MD 20912
(301) 891-1100

The Nature Conservancy
The Nature Conservancy
1815 N. Lynn Street
Arlington, Virginia 22209
(800) 628-6860

Buzzworm
Buzzworm, Inc.
2305 Canyon Boulevard
Suite 206
Boulder, CO 80302
(303) 442-1969

P-3, The Earth Based Magazine for Kids
P.O. Box 52
Montgomery VT 05470
(802) 326-4669

Garbage
Old House Journal
P.O. Box 56519
Boulder, CO 80322
(800) 274-9909

E: The Environmental Magazine
Subscription Department
P.O. Box 6667
Syracuse, NY 13217
(800) 825-0061

Clearing
Creative Educational Networks
John Inskeep Environmental
Learning Center
19600 S. Moalla Avenue
Oregon City, OR 97045

Science Scope
The Science Teacher
Science and Children
National Science Teachers
Association
1840 Wilson Blvd.
Arlington, VA 22201-3000

We Want Your Feedback!

Your feedback can help us make "Getting Started" as useful as possible. Please take a moment to fill out postage-paid form on the adjoining page to help us help others *get started.*

Thank you for your comments!

Detach here, then turn over, fold, tape, and send!

General Feedback

How useful did you find the following sections of "Getting Started"?
(1=least useful; 5=most useful)

1 2 3 4 5 Profiles of teachers

1 2 3 4 5 Description of how to get started

1 2 3 4 5 Where to look for materials

1 2 3 4 5 Locating financial support

1 2 3 4 5 Addresses of organizations

1 2 3 4 5 List of selected instructional materials

Feedback on Stories

Which ***one*** statement most accurately describes you:

__ I read only the stories that followed the chapter I was interested in

__ I read only the stories relating to my grade or subject area

__ I did not read any of the stories. I read only the informational portions of "Getting Started"

What made some stories more interesting than others?

_____

_____

_____

Did any of the stories...

...give you a new idea that you have done or plan to do with your students?
__Yes __No; If yes, which ones?

...give you ideas on how to involve other teachers in your school in EE?
__Yes __ No; If yes, which ones?

...give you ideas on where to find funding for your EE efforts?__Yes __ No; If yes, which ones?

...give you ideas on where to find other educators in your area/state/region interested in EE?__Yes __ No; If yes, which ones?

...motivate you to attend an EE workshop?__Yes __ No; If yes, which ones?

Other: _____

_____

_____

Did you contact any of the teachers profiled in "Getting Started"?
__ Yes __ No

If so, was the contact helpful? __Yes __No

If so, how? (check all that apply)

__ Provided information I can use in my classroom

__ Shared ideas/suggestions

__ Provided names of other organizations to contact

Other: _____

_____

Feedback on Information

Did you contact any of the groups listed in "Getting Started?"
__ Yes __ No

If so, was the contact helpful? __ Yes __No

If so, how? (check all that apply)

__ Provided information I can use in my classroom

__ Shared ideas/suggestions

__ Provided names of other organizations to contact

Other: _____

_____

_____

Your Profession

__ Teacher (circle one): (Lower El / Upper El / MS / HS / Other)

Subject(s) taught: _____

__ School Administrator

__ Natural Resource Professional

Other: _____

_____

Your level of familiarity with EE in the classroom

__ Have never done EE in my classroom

__ Have occasionally incorporated an EE activity into my classroom/course

__ Have designed and taught an entire unit on the environment in my classroom

__ Have integrated EE into my entire classroom/course

Other: _____

_____

How did you find out about "Getting Started?"
Put an "X" in front of each that applies:

__ From a colleague

__ At an Environmental Education workshop

__ My State's Department of Education EE Office

__ Regional EPA EE Office

__ A State EE association/organization

__ A newsletter or magazine? Which one? _____

Other: _____

_____

Do you know a teacher or administrator who has done wonderful things in Environmental Education that we should include in the next "Getting Started?"

Your name:

Teacher or Administrator's name:

School:

Telephone number:

Address:

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INCEET
National Consortium for Environmental Education and Training

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